

Eastern Interior

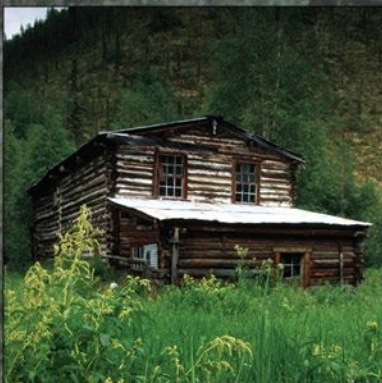
January 2013

Draft Resource Management Plan
and Environmental Impact Statement

Hardrock Mineral Leasing in the White Mountains National Recreation Area

Supplement to the Eastern Interior Draft Resource
Management Plan and Environmental Impact Statement

Eastern Interior Field Office, Alaska



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Bureau of Land Management-Alaska
Eastern Interior Field Office
Fairbanks, Alaska

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In Reply Refer to:
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Dear Reader:

We are pleased to provide this Supplement to the Eastern Interior Draft Resource Management Plan/Environmental Impact Statement (Draft RMP/EIS) for your review. The Supplement amends Alternative D to recommend opening 160,000 acres (16 percent) of the lands in the White Mountains National Recreation Area (NRA) to possible exploration and leasing of hardrock minerals, including placer gold and rare earth elements.

On March 2, 2012, the Environmental Protection Agency published a "Notice of Availability of the Draft EIS" in the *Federal Register* (77 FR 12835), beginning a 150-day public comment period. The Draft RMP/EIS addressed hardrock mineral leasing in the White Mountains NRA as an alternative considered, but not analyzed in detail. According to the BLM's initial interpretation of the Alaska National Interest Lands Conservation Act (ANILCA) and leasing regulations, only holders of valid mining claims could qualify for a lease – no more such claims are located in the White Mountains NRA. After the BLM received public comments in response to the Draft RMP/EIS that raised issues on leasing, this led us to further legal research on the issues. We eventually concluded that our initial interpretation was incorrect.

This Supplement analyzes a full range of alternatives on hardrock mineral leasing in the White Mountains NRA, and we are seeking public comments on this Supplement. Issuing the Supplement months after releasing the Draft RMP/EIS certainly poses some challenges for keeping the RMP on track. However, we concluded that addressing hardrock mineral leasing now is better than risking even longer delays later in the planning process.

Since we released the Draft RMP/EIS in March, we've received your public comments at meetings in 12 communities and heard from many of you via email or the RMP/EIS website. You've provided lots of useful information and raised important questions for the BLM to consider. To ensure everyone has sufficient time to comment on the Supplement, we are extending the public comment period for the Draft RMP/EIS and Supplement for 90 days after the EPA publishes its notice of receipt of the Draft EIS in the *Federal Register*. We will also schedule additional public meetings. There are three ways you can submit comments:

- 1) At public meetings in communities within the planning area to discuss the Supplement and Draft RMP/EIS. We will announce the meeting dates, times, and specific locations through news releases and on the Eastern Interior RMP/EIS website at <http://www.blm.gov/ak>.

- 2) You can send written comments to the BLM Fairbanks District Office, Attn: Eastern Interior Draft RMP/EIS, 1150 University Avenue, Fairbanks, Alaska, 99709.
- 3) You may also submit comments online through an interactive document at https://www.blm.gov/epl-front-office/eplanning/lup/lup_register.do.

We will consider and evaluate all comments, and will address substantive matters raised in the comments in the Proposed RMP/Final EIS. We will also review and consider public comments before deciding whether or not to include hardrock leasing in the agency preferred alternative for the Proposed RMP/Final EIS. The most useful comments are specific and address one or more of the following:

- Inaccuracies or discrepancies in information
- Identification of new information that would have a bearing on the analysis
- Identification of new impacts, alternatives, or mitigation measures
- Suggestions for improving management direction

All public comments submitted for this planning review, including names and street addresses of respondents, will be available for public review at the Fairbanks District Office during regular business hours, 7:45 a.m. to 4:30 p.m., Monday through Friday, except holidays; and the BLM may publish them as part of the Final EIS. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. We will have all submissions from organizations and businesses, or from individuals identifying themselves as representatives or officials of an organization or business, available for public inspection in their entirety.

We appreciate your help in this planning effort and we look forward to your continued interest and participation.

If you'd like additional information or clarification regarding the Supplement to the Draft RMP/EIS or the planning process, please contact Jeanie Cole, Planning and Environmental Coordinator or Lenore Heppler, Eastern Interior Field Manager at (907) 474-2200.

Sincerely,



Bud C. Cribley
State Director

Acronyms

AAC:	Alaska Administrative Code
ACEC:	Area of Critical Environmental Concern
ADEC:	Alaska Department of Environmental Conservation
ADF&G:	Alaska Department of Fish & Game
ANILCA:	Alaska National Interest Lands Conservation Act
AO:	Authorized Officer
ATV:	All-terrain vehicle
BLM:	Bureau of Land Management
CFR:	Code of Federal Regulations
DGGS:	Alaska Division of Geological and Geophysical Surveys
EIS:	Environmental Impact Statement
NEPA:	National Environmental Policy Act
NIP:	non-native invasive plant
NIS:	non-native invasive species
NRA:	[White Mountains] National Recreation Area
OHV:	Off-highway Vehicle
ORV:	Outstandingly remarkable value [pertaining to wild and scenic rivers]
POL:	Petroleum, oil, and lubricants
REE:	Rare earth element
RFD:	Reasonable Foreseeable Development
RMP:	Resource Management Plan
ROP:	Required Operating Procedure
USFWS:	U.S. Fish and Wildlife Service
UTV:	Utility Terrain Vehicle
VABM:	Vertical Angle Benchmark [surveying term]
VRM:	Visual Resource Management
WSR:	[National] Wild and Scenic River [Beaver Creek WSR]

Chapter 1. Introduction

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Introduction

The Bureau of Land Management (BLM) published a Notice of Availability of the Eastern Interior Draft Resource Management Plan and Environmental Impact Statement (RMP/EIS) in the *Federal Register* on February 24, 2012 (77 FR 11154). The Environmental Protection Agency published its Notice of Availability of the Draft RMP/EIS in the *Federal Register* on March 2, 2012 (77 FR 12835), beginning a 150-day public comment period. The Draft RMP/EIS considered hardrock mineral leasing in the White Mountains National Recreation Area (NRA) as an alternative considered but not analyzed in detail (section 2.3 of the Eastern Interior Draft RMP/EIS).

When preparing the Draft RMP/EIS, the BLM understood the provisions under the Alaska National Interest Lands Conservation Act (ANILCA) for hardrock leasing in the White Mountains [NRA](#) (implemented by 43 CFR 3585) to apply only to removal of hardrock minerals from mining claims that existed before November 16, 1978. Since there are no longer any mining claims of record within the NRA, it was thought that no one could meet the requirements to lease hardrock minerals. This interpretation was incorrect, as the BLM, through its regulations at 43 [CFR](#) part 3580, has interpreted Section 1312 of [ANILCA](#) as allowing for disposal of hardrock minerals by lease in the White Mountain NRA even in the absence of an underlying unperfected mining claim, subject to certain findings by the Secretary.

To analyze an adequate range of alternatives and obtain public comment on hardrock mineral leasing in the White Mountains NRA, the BLM issued this Supplement to the Eastern Interior Draft RMP/EIS. This Supplement amends Alternative D to include the hardrock mineral leasing scenario. This alternative would recommend making approximately 160,000 acres in the White Mountains NRA available for hardrock mineral leasing. This Supplement describes the additions to Alternative D and environmental effects associated with the hardrock mineral leasing scenario. Only after receiving, reviewing, and considering public comment, will the BLM decide whether or not to recommend opening the NRA to hardrock mineral leasing as a feature of the agency preferred alternative in the Proposed RMP/Final EIS.

In this document, a hardrock mineral leasing program refers to issuing exploration licenses and mineral leases for the exploration and development of known deposits of placer gold and rare earth elements. Both gold and rare earth elements are locatable minerals normally only available through mining claims. As discussed above, however, [ANILCA](#) allows for leasing hardrock minerals in the White Mountains, but not for the location of new mining claims. Mineral leasing is done through a lease sale at the discretion of the BLM. Leases are for a defined term, a royalty is charged, and the lease may contain leasing stipulations at the time of the lease sale.

Pursuant to Section 810 of ANILCA, the BLM evaluated the effects of the revised Alternative D presented in this Supplement on subsistence activities and determined that there may be a significant restriction on subsistence uses. These findings are located in [Appendix B](#) of this document. The [BLM](#) will hold public hearings related to Section 810 findings in conjunction with public meetings on the Supplement. The BLM will announce notice of specific dates and locations for public meetings and ANILCA hearings, through public notices, media releases, and/or mailings.

Background

Section 1312 of ANILCA (16 U.S.C. 460mm-4) withdrew the lands within the White Mountains [NRA](#) from location, entry, and patent under the Mining Law of 1872, but allows the Secretary to

“permit the removal of the nonleasable minerals” from these lands, provided the Secretary makes a finding that such disposition would not have significant adverse effects on the administration of the NRA. The BLM interprets Section 1312 as allowing for the disposal of previously locatable minerals (such as gold) within the NRA by lease, as described in its regulations at 43 CFR part 3580, subpart 3585. Pursuant to land use plan decisions, BLM lands can be opened to mineral leasing and development when “such use and development would be compatible with, or would not significantly impair, public recreation and conservation of the scenic, scientific, historic, fish and wildlife or other values contributing to public enjoyment” (43 CFR §3585.1).

The existing White Mountains Resource Management Plan (BLM 1986) recommended opening approximately 44 percent of the NRA to leasing of hardrock minerals. This decision was never implemented.

In April 1986, the BLM issued a final rulemaking in the *Federal Register* revising the provisions of 43 CFR part 3500 concerning the leasing of solid minerals. Included in this rulemaking were regulations allowing for hardrock mineral leasing in the White Mountains NRA.

A U.S. Bureau of Mines (Fechner and Balen 1988) assessment of the placer resources in the White Mountains documented economically recoverable quantities of placer gold in the Nome and Beaver Creek drainages. Many of the areas known placer deposits were under claim at the time of withdrawal. These claims have since lapsed, and due to the withdrawal, no new claims could be staked. The deposits identified by the U.S. Bureau of Mines and those once under claim, have not seen significant development activities since the establishment of the White Mountains NRA in 1988.

Mapco Incorporated explored for uranium in the 1970s and found a high-grade rare earth element (REE) deposit hosted in granite at the headwaters of Roy Creek. Rare earth elements found in the area include lanthanum (La), praseodymium (Pr), Cerium (Ce), and neodymium (Nd). In this document, these rare earth elements are generally referred to as the Roy Creek REE deposit.

REEs are a set of 17 metals including the 15 lanthanides, yttrium, and scandium. Because of their geochemical properties, REEs are not often found in concentrated and economically exploitable forms. REEs are used in hybrid automobiles, wind turbine generators, and many high tech industrial and consumer products. During the past 20 years there has been a greatly increased demand for many of these products requiring REE. Only recently has there been an interest in REEs in the planning area since Chinese export restrictions have caused their price to spike. The known deposit of REE minerals in the White Mountains is restricted to a specific occurrence of granite mapped in the Roy Creek area.

Chapter 2. Alternatives

This Supplement modifies the Eastern Interior Draft RMP/EIS by adding the following decisions to Alternative D for the White Mountains Subunit (BLM 2012a, section 2.8.2.3). All alternatives are described in more detail in the Eastern Interior Draft RMP/EIS (BLM 2012a).

Alternative D

Alternative D for the White Mountains Subunit of the Eastern Interior Draft RMP/EIS would include the following decisions:

Approximately 160,000 acres in the White Mountains [NRA](#) would be recommended open for leasing of hardrock minerals (Figure 2.1).

- 64,000 acres of lands with known placer deposits of gold and high development potential would be open for leasing. Competitive leases issued in Quartz Creek will contain stipulations requiring mining by suction dredging only;
- 85,000 acres of lands with known placer deposits of gold and medium development potential would be open for leasing; and,
- 11,000 acres of lands with known deposits of four rare earth elements, lanthanum (La), praseodymium (Pr), Cerium (Ce), and neodymium (Nd), would be open for leasing.

The Required Operating Procedures (ROPs) and Leasing Stipulations in [Appendix A](#) of this document would apply to hardrock mineral leasing and exploration licenses. The BLM has the authority to include special lease stipulations for the protection of the surface, its resources and use for recreation (43 CFR 3585). The BLM would use this authority to develop additional lease stipulations as appropriate at the time of a lease sale or approval of an exploration license.

This Supplement changes only Alternative D. Alternative D is not the Agency Preferred Alternative. The other alternatives are:

Alternative A (No Action Alternative)

The White Mountains NRA would remain closed to hardrock mineral leasing. Although the White Mountains RMP (BLM 1986) recommended opening the Semi-Primitive Motorized Unit (428,000 acres) to leasing of hardrock minerals, this decision was never implemented.

Alternatives B and C (Agency Preferred Alternative)

No lands within the White Mountains Subunit would be recommended open to leasing of hardrock minerals.

Table 2.1. Hardrock Mineral Leasing White Mountains Subunit: Summary of Alternatives

Program	Alternative A (No Action)	Alternative B	Alternative C (Agency Preferred)	Alternative D
Hardrock mineral leasing		0 acres open		160,000 acres open to leasing

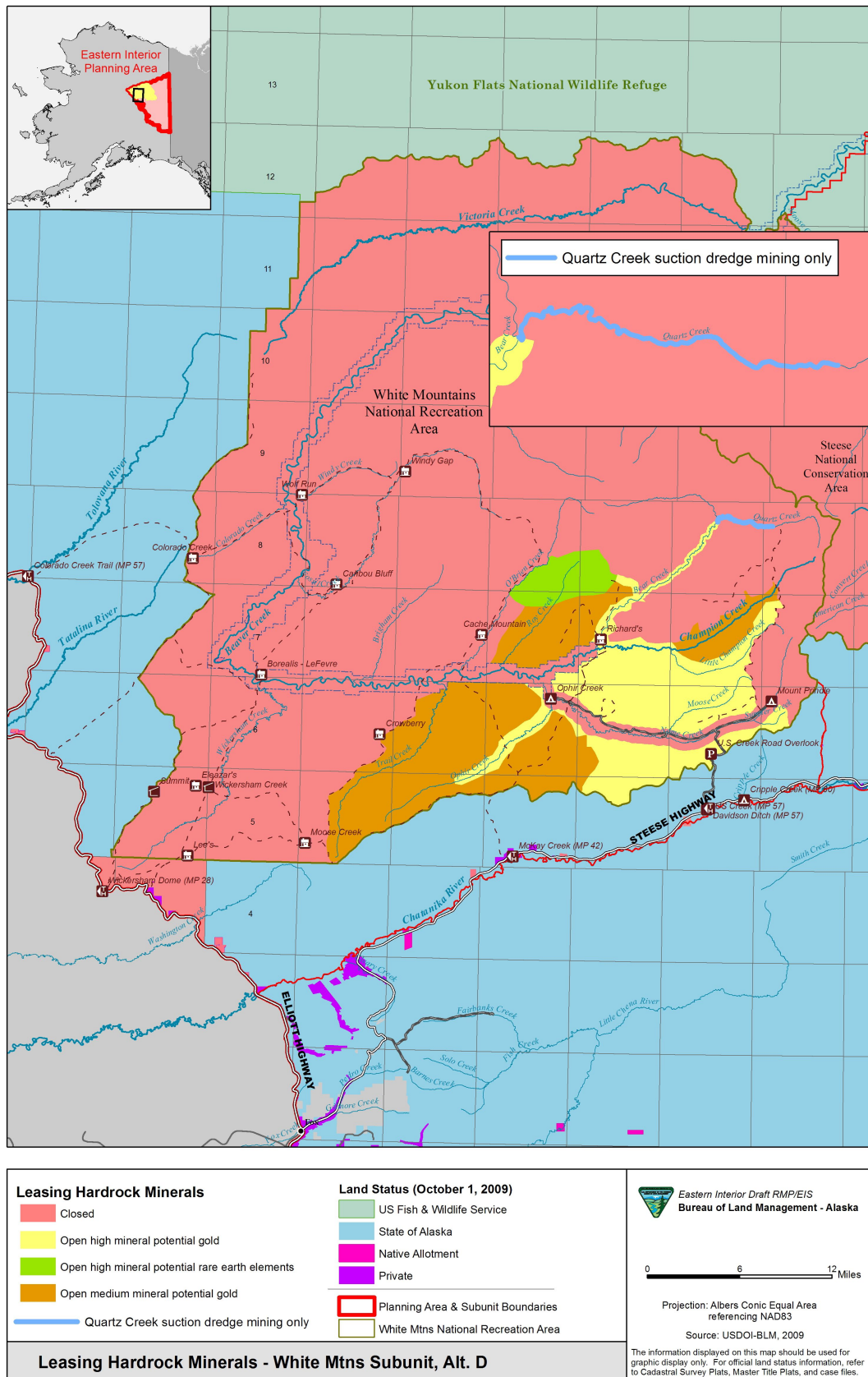


Figure 2.1. Alternative D Hardrock Mineral Leasing Areas

2.1. Summary of Impacts

The following table summarizes the impacts in Alternative D with the addition of hardrock mineral leasing. For a summary of impacts of other programs and alternatives, see section 2.9 of the Eastern Interior Draft RMP/EIS (BLM 2012a).

Table 2.2.

Program or resource	Alternatives A–C	Alternative D
Cultural and Paleontological Resources	None	Possible disturbance to historic and prehistoric sites. Increased access to areas open to hardrock mineral leasing increases potential for both inadvertent and intentional damage to resources.
Fish and Aquatic Species	None	Suction dredging has been shown to locally reduce benthic invertebrates; cause mortality to early life stages of fish; destabilize spawning and incubation habitat; remove large roughness elements such as boulders and woody debris; increase suspended sediment; decrease the feeding efficiency of sight-feeding fish; and, reduce living space by depositing fine sediment. Alternatively, suction dredging may temporarily improve fish habitat by creating pools or spawning gravels. Operations that do not alter streambank stability or adversely impact riparian and stream channel function, are likely to be minimal and of short-term duration (less than or equal to five years). Placer mining can negatively affect fish and aquatic resources by degrading or eliminating aquatic habitat; reducing available food sources and water quality; reducing available pool habitat; eliminating riparian vegetation and function; creating sparsely vegetated valleys and floodplains with slow rates of natural revegetation and unstable stream channels with highly erodable beds and banks; altering the longitudinal slope, geometry, and sediment transport rates in streams; and, creating undersized or absent floodplains. Placer mining may directly affect an estimated eight miles of stream. With ROPs and good conditions, streams would trend toward a functional, but altered, habitat within five to ten years after reclamation. Mechanized placer mining within the headwaters of Beaver Creek Wild and Scenic River (WSR) may affect water quality, the recreational grayling fishery in Beaver Creek, and Beaver Creek Chinook (a BLM-Alaska Watch List species).
Non-native Invasive Plants	None	Mineral leasing and associated access would increase the likelihood of the introduction, establishment, and spread of nonnative invasive plants (NIP). Indirect impacts would result where NIP become established due to hardrock exploration development, including potentially long-term changes in plant community structure and diversity and wildlife habitat degradation. Costs include long-term monitoring and control. Containment and control of NIP may include further soil disturbance and the application of herbicides, also for the long-term. ROPs and Leasing Stipulations (Appendix A) would reduce the level of impact.

Program or resource	Alternatives A–C	Alternative D
Soil and Water Resources	None	<p>Placer mining can have an adverse effect on the structure of the existing soil profile by stripping of overburden and riparian/wetland vegetation. There is an irretrievable loss of any soil that enters waterways and is transported downstream. The primary impact to water quality is an increase in sedimentation and turbidity. Some direct effects on water quality can be anticipated during the development stage of an operation, resulting in short-term increases in sediment levels and turbidity while equipment operates near or in the active stream channel. It is likely that occasional high water or failure of water control structures would introduce sediments collected by the water treatment system into the stream channel, resulting in short-term increases in turbidity and sediment load levels and possible localized sedimentation of the stream substrate. Stream channel morphology would be directly affected in all areas where activities associated with mining occur in the active channel. Indirect impacts to water quality would occur through non-point source erosion from disturbed areas directly adjacent to stream channels. Channel readjustment would occur where the active channel was modified. These processes increase suspended sediment into the stream system, particularly during spring break-up and floods. Impacts to soil and water resources could be expected to decrease after cessation of mining, successful revegetation, and channel stabilization. Reestablishing vegetation on placer waste rock piles may take decades. All placer mine operations would be required to recycle turbid water through settling ponds to prevent high turbidity discharge into streams and to reclaim disturbed stream channels and riparian areas. It is anticipated that turbidity as a result of direct and indirect discharge from placer mine operations would meet ADEC water quality standards. ROPs shown in Appendix A would be implemented to reduce impacts to soil and water resources.</p>
Special Status Species	None	<p>Wetland, riparian, and aquatic habitats support most BLM-Alaska sensitive animal species. Most sensitive plant species occur on the uplands. Exploration for rare earth elements may affect sensitive plant species. Placer mining and associated changes in access could result in substantial local impacts to riparian and aquatic habitats and species. Hardrock leasing would impact individuals of some BLM-Alaska sensitive species. The distribution of most of these species is not well-known. Implementation of ROPs (Appendix A) would reduce impacts. It is not anticipated that hardrock mineral leasing would trend any sensitive species toward federal listing.</p>
Vegetation	None	<p>Native vegetation, mostly riparian and wetland habitats, would be lost on an estimated 661 acres. Times to reestablish vegetative cover would vary widely. Some areas would remain unvegetated for several to many years. Areas with adequate fine and organic soil materials and viable seed and vegetative plant parts would revegetate relatively quickly. ROPs requiring vegetation cover to meet pre-determined standards would result in faster revegetation. Riparian areas where a stable stream channel was not established would remain largely unvegetated until the channel stabilizes. Loss of fines and organic material through flooding and shifting channels can delay revegetation for decades. Roads and trails developed for access would disturb an undetermined area of native vegetation and supporting soils. Heavy, season-long use may result in significant loss of vegetation and degrading of soils in a variety of vegetation types. Additional disturbance would occur through expansion of this network of roads and trails by recreational users. Much of the hardrock leasing area burned in 2004 and soils and vegetation may be more susceptible to impacts from motorized use.</p>

Program or resource	Alternatives A–C	Alternative D
Visual Resources	None	<p>Eighty-four percent of the White Mountains NRA would be closed to mineral leasing including Beaver Creek WSR, research natural areas, and reclaimed areas along Nome Creek, protecting visual resources in these areas. Visual resources would be affected within the 160,000 acres open to mineral leasing. Surface disturbing activities associated with exploration and mining, such as drilling, trenching, access trails, removal of vegetation and stockpiling of materials, would impact line, form, color, and texture of mined areas creating contrast between mined areas and background landforms. These activities may attract the attention of the casual observer from various distances. Large-scale placer mining would have the greatest impact to visual resources. Small-scale placer mining would have similar impacts, but at a smaller scale. Movement of materials from dredging occurs underwater and thus does not have a noticeable impact on visual resources. Suction dredging camps would impact visual resources on less than six acres annually. Mineral exploration activities would impact visual resources on an estimated 70 acres.</p>
Wildlife	None	<p>Mineral leasing activities and associated access would result in disturbance of more than 661 acres of terrestrial wildlife habitat. Much of this disturbance would occur to riparian areas and wetlands habitats which are typically high-value wildlife habitats. Effects on these habitats would extend, to some extent, downstream into Beaver Creek WSR. Human activities associated with mines would reduce use of riparian habitats by many wildlife species in the immediate vicinity of the activity. Changes in access and resulting increases in human use of the area may have a greater effect on wildlife and their habitats than direct habitat disturbance. In general, motorized access would increase throughout the leasing area. Human use of additional access to sheep habitats in the Upper Champion Creek and Quartz Creek area may reduce sheep use of those habitats. Moose may benefit from some ground disturbances that result in growth of deciduous browse species. Increased hunting pressure and harvest in previously remote areas would likely reduce harvest in areas with already-established access, such as Nome Creek. Hunting pressure may result in some displacement of moose from high-density rutting areas. Most of the habitat disturbance would occur within the historical calving range of the Fortymile caribou herd and current calving area of the White Mountains caribou herd. The greatest impact to caribou would likely be the change in access, human infrastructure, and the generally increased levels of human activity in the area. Although placer mining operations may have little direct effect on caribou use of the area, the combined direct and indirect effects from changes in access and human use patterns would likely reduce the suitability of the area as calving habitat and potentially reduce the likelihood that the Fortymile Herd would reestablish a habit of calving season use of the White Mountains. Compared with other large migratory caribou herds, the Fortymile herd's current annual range has a low proportion of range above treeline (17%; Boertje et al. in press). Boertje and others (in press) surmised that overgrazing of the herd's current core upland tundra habitat may have resulted in reduced herd nutrition levels and suggested that expansion to additional spring and summer upland tundra in the White Mountains may be of key importance to realizing continued herd growth. Several species of migratory birds are dependent on (or found in much higher densities in) riparian habitats. Placer mining would remove habitat for these species in localized areas and habitat recovery may require several decades.</p>

Program or resource	Alternatives A–C	Alternative D
Recreation and Travel Management	None	<p>Direct impacts to recreation include visual impacts, short-term user conflicts, exhaust, and noise impacts. In contrast to the short-term noise and exhaust produced by a passing motorized vehicle, noise and exhaust from suction dredging and mechanized placer mining would persist for hours. Some recreation visitors anticipating a backcountry experience may be displaced. Buffers around BLM cabins and Nome Creek would help reduce impacts from noise in these areas. Occupancy of mining equipment and related operations may last for 90 days per operation and displace some recreation users. Proper location of camps and staging areas could reduce this impact. Views of mining activity would be visible from ridge tops (e.g., Table Top Trail). The visual resource management ROPs (Appendix A) would help reduce visual impacts.</p> <p>Increased turbidity, inherent with mining activities, would reduce the aesthetic appeal of Beaver Creek and influence the floating experience by boat floaters. Beaver Creek supports a popular grayling fishery. Fishing success would decrease in muddy water and displace some users. River hazards are more difficult to identify in muddy water, increasing floating difficulty. Access routes to leases could benefit other users if constructed in the proper locations using sustainable trail construction techniques. Roads and trails associated with mining would be attractive to motorized recreation users. While contributing to greater access by the motoring public it would also greatly expand the proliferation of user-made trails and multiple routes to the same location. Mobilization of mining equipment on existing trails would require the trails to be widened possibly attracting use of vehicles larger than allowed by current OHV regulations. Increased summer use on winter trails would make winter trail maintenance difficult and reduce the quality of the trails for winter uses. Indirect effects from road construction include the reclamation of road beds after the life of the mine or the maintenance and redevelopment of sustainable road infrastructure by the BLM, requiring additional expense and maintenance beyond the life of the plan. Direct effects to recreation may be short-term and could be mitigated. The access needs and infrastructure associated with mining would increase the proliferation of user-created trail networks in a heavily used area. The proximity to Fairbanks and growing popularity of the area, coupled with the existing recreational facilities would have a cumulative adverse effect on the administration of the recreational area and may result in increased maintenance cost for BLM.</p>
Subsistence	None	<p>Impacts include user conflicts, displacement of resources, and potential declines in resource availability due to disturbance in critical habitats (spawning) or during critical times (e.g., calving periods). Minimal direct impacts to subsistence wildlife resources or uses would occur from hardrock mineral leases and exploration licenses because of seasonal restrictions on activities in Dall sheep lambing and caribou calving habitats. Indirect impacts are expected to be greater and more difficult to mitigate. Increased access to largely remote wildlife habitat is expected to occur. The resulting increase in non-mining activities may cumulatively reduce the suitability of the areas for calving and postcalving. Data indicates that current calving and postcalving range for the Fortymile caribou herd has been diminished from overgrazing and limited suitable habitat is available. The research indicates that habitat in the White Mountains would become increasingly important to continued growth and stability of the Fortymile herd (Boertje et al. in press). Analysis of indirect impacts to Fortymile caribou from mineral leasing resulted in a finding of may significantly restrict subsistence use of Fortymile caribou (Appendix B). Some conflicts with federal subsistence hunters may occur from mid-August through September and from November through March if exploration and</p>

Program or resource	Alternatives A–C	Alternative D
		<p>placer mining is active during these time periods. Access by subsistence hunters may be restricted due to perceived or real barriers to wildlife resources, displacing hunters to other areas. Caribou are generally distributed over a wide area, thereby minimizing access issues for subsistence hunting. Moose are available through the greater area and much of the rural resident harvest of moose occurs outside the area open to mineral leasing. Conflicts among hunters would not be expected to be significant. Spawning areas for Chinook salmon have been identified within Ophir Creek. Because active mining is likely to occur in and adjacent to these spawning areas, direct impacts on this population are expected. Indirect impacts to subsistence fish species and water quality may occur downstream due to turbidity, crossing of streams, high water events and occasional failure of settling ponds. These impacts would likely be short-term. Regulations and ROPs that require recycling of turbid water through settling ponds and reclamation of disturbed stream channels should mitigate most of these impacts.</p>
Economic	No additional positive economic effects.	<p>Exploration and leasing for placer gold and rare earth mineral exploration would result in positive economic effects. The total mining employment on BLM-managed lands would be estimated at 84 part-year workers. The full-time equivalent in the White Mountain Subunit would be approximately 35 workers, based on the Stebbins (2009) models. Total employment by the Alaska minerals industry in 2008 was 3,392 full-time equivalent jobs (Szumigala et al., 2009). The statistics indicate less than one percent of the statewide industry employment on BLM-managed lands would occur at White Mountain operations. The DGGs reported the average monthly wage for mining in Alaska during 2010 at \$8,345. White Mountains gold mining operations account for approximately \$3 million in wages, annualized.</p>
Environmental Justice	None	<p>Minority and low income populations would not be disproportionately impacted. Minority or low income populations in the Fairbanks area may benefit from employment in the recreation and mining industries. New mining leases and mineral exploration could result in additional employment accruing to local populations. Possible negative impacts to environmental justice populations and the entire population of the area include loss of employment in another existing industry due to mining development. However, there are no commercial activities in the area potentially opened to mining under Alternative D providing employment that will be affected.</p>

Chapter 3. Affected Environment and Environmental Consequences

The following sections describe the environmental consequences that would occur due to hardrock mineral leasing in Alternative D. There would be no impacts associated with hardrock mineral leasing under Alternative A (No Action Alternative), Alternative B, or Alternative C. Therefore, these alternatives are not discussed any further.

3.1. Assumptions for Analysis

This section describes the assumptions used for analysis of impacts and the level of exploration and development that is reasonably foreseeable during the life of the plan in Alternative D.

3.1.1. Alternative D

The following information is summarized from the *Eastern Interior RMP Reasonably Foreseeable Developments for Locatable Minerals and Leasable Hardrock Mineral Resources in the White Mountains Subunit* (BLM 2012b) which is incorporated by reference. In the reasonably foreseeable development scenario (RFD) the BLM developed models for typical suction dredging, small placer, and large placer operations, describing acres of annual disturbance, size of the crew, hours of operation, fuel requirements, and type of equipment used for each type of operation. These same models were used for the analysis of hardrock mineral leasing. This analysis assumes that development under mineral leases would occur in a similar manner to development under the 3809 regulations (43 [CFR](#) 3809).

In accordance with the regulations for hardrock leasing (43 CFR 3500), the BLM envisions the following potential developments:

1. The BLM would offer competitive leases for known deposits of placer gold in areas with high development potential (64,000 acres).
2. In the areas of known deposits of placer gold with medium development potential (85,000 acres), the BLM could issue exploration licenses based on public interest, likely leading to additional placer leases.
3. The BLM could issue exploration licenses based on public interest in the Roy Creek known REE deposit (11,000 acres). It is unlikely that any lode mineral occurrences explored under a license would move to a production lease within the anticipated twenty-year life of this plan.

Methodology for Estimation of Mining Activities

To estimate the types and number of mining-related activities that might occur in the White Mountains if known mineral deposits were made available for leasing, the BLM compared State of Alaska land of a similar nature in the Steese Subunit. For every 7,000 acres of state land in the Steese, there is one typical placer operation. There is one suction dredge operation for every six miles of dredgable stream on high development potential areas of the Steese. These ratios are applied to areas of known mineral deposits in the White Mountains NRA to establish the number of anticipated mechanical placer mining leases, suction dredge leases, and both [REE](#) and placer exploration licenses over the life of this plan (Tables 3.1 and 3.2). Tables 3.1 and 3.2 include only acreage that can be directly estimated. Surface disturbance due to access routes was not estimated.

Access Assumptions

In order to reduce impacts, access would generally be limited as follows:

- Helicopter access for exploration licenses in the Roy Creek REE deposit;
- No construction of roads for exploration licenses;
- Winter overland moves for heavy equipment;
- Summer access by all-terrain vehicle ([ATV](#)), consistent with off-highway vehicle (OHV) designations for Alternative D (limited to 1,000 pounds curb weight and 50 inches width). The BLM could approve heavier vehicles, such as utility terrain vehicles (UTV), on a case-by-case basis. The BLM would determine access routes to mining locations off current BLM-managed recreational trails on a case-by-case basis. Seasonal restrictions may apply;
- Aircraft (helicopter or fixed-wing); and,
- The BLM could consider construction of new access roads for placer development on a case-by-case basis if consistent with recreation management objectives and if other access was not feasible. The BLM estimates up to 20 miles of roads could be built over the life of the plan.

Leases

The BLM may issue a competitive lease on unleased lands where a known valuable mineral deposit exists. This lease is accomplished through a competitive lease sale. There are two types of leases applicable to hardrock mining in the White Mountains NRA, and they are described in more detail below.

Suction Dredge Placer Leases: In addition to the mechanical operations described below, the BLM estimates there would be 10 suction dredge operations on lands with high placer development potential and one additional operation on lands with medium development potential. A suction dredge operation is limited to within active stream margins and would disturb about one-half acre per year. The maximum potential disturbance from all 11 operations for the twenty-year life of the plan with natural concurrent reclamation is 84 acres.

Mechanized Placer Leases: To estimate the effects of development of traditional placer mining operations, the BLM considered two mining models: a smaller mobile placer operation using a small dozer and excavator feeding an 11 cubic yard-per-hour washplant and a larger 145 cubic yard-per-hour “Kantishna-type” washplant supported by a larger excavator and track-dozer. A small operation would mine and reclaim one acre per year, but have a continual 4.4 acres of disturbance per year for a total disturbance of 27 acres for the life of this plan. A large operation would have a continual 20 acres of disturbance and a total disturbance of 107 acres over the life of this plan. The BLM estimates there could initially be two large and eight small operations annually, with an additional three small operations following work done under exploration licenses, for a total disturbance of 507 acres over the life of the plan.

Exploration Licenses

An exploration license allows the applicant to explore known mineral deposits to obtain geologic, environmental, and other pertinent data concerning the deposits. The application for an exploration license includes an exploration plan approved by the BLM that becomes part of the license. The requirements for an exploration plan are described in 43 CFR 3505.45. A proposed notice of exploration must be published, inviting others to participate in the exploration under the license on a pro-rata basis. Applications for exploration licenses would be subject to site-specific analysis under the National Environmental Policy Act (NEPA). Site-specific measures to protect the environment and use for recreation would be included in the approved exploration license. There are two types of licenses applicable to hardrock mining in the White Mountains NRA, and they are described in more detail below.

Placer Exploration Licenses: The BLM may require exploration of placer resources in the medium development potential areas prior to issuing placer leases; the applicant may request exploration licenses in the higher development potential areas before the BLM offers competitive leases. Most placer exploration would cause minimal disturbance, but the applicant could also request approval for more intensive placer sampling with heavy equipment. The BLM anticipates there could be four exploration licenses (5,000 acres each) requested within the lands opened to leasing, resulting in direct disturbance to and reclamation of 20 acres over the life of the plan.

Rare-Earth Element Exploration Licenses: If the White Mountains NRA were opened to hardrock leasing, there would likely be an exploration license request for the 11,000 acres in the Roy Creek [REE](#) known deposit. Exploration activities would range from field mapping and sampling, to trenching and core-drilling. The total life-of-plan disturbance from exploration of the Roy Creek REE deposit is expected to be 50 acres.

Table 3.1. Anticipated Activity Due to Hardrock Leasing in the White Mountains Under Alternative D

Activities under Reasonably Foreseeable Exploration and Development	High Potential Lands – Gold	High Potential Lands - REE	Medium Potential Lands – Gold	Total
# Suction dredge placer leases	10 leases		1 lease	11
Life of plan disturbance due to suction dredging (active stream channel only)	76 acres		7.6 acres	84 acres
# Mechanized placer leases	2-large leases 8-small leases		3- small leases	13 leases
Life of plan disturbance due to mechanized placer mining (uplands/floodplains)	427 acres		80 acres	507 acres
Total lease disturbance (20 years)	503 acres		88 acres	591 acres
Acres open to leasing	64,000 acres	11,000 acres ^a	85,000 acres	160,000 acres

^aNo production leases anticipated during the life of the plan.

Table 3.2. Anticipated Activity Associated with Exploration Licenses in the White Mountains Under Alternative D

Activities under Reasonably Foreseeable Exploration and Development	High Potential Lands Lode REE	Medium Potential Lands – Placer Gold	Total
# Placer exploration licenses		4	4
Area licensed for placer (acres)		20,000	20,000
Acres of disturbance due to placer exploration licenses		20	20
# Lode exploration licenses	1		1
Area licensed (acres)	11,000		11,000
Acres of disturbance due to lode exploration licenses	50		50
Total disturbance from exploration licenses (20 years)	50 acres	20 acres	70 acres

3.2. Affected Resources

3.2.1. Cultural and Paleontological Resources

Affected Environment

Placer gold prospecting and mining has occurred in some drainages in the White Mountains NRA for more than 100 years. The specific areas outlined in Alternative D equate to areas of known historic mineral activity. Non-systematic archaeological surveys in these areas have found historic mining sites immediately adjacent to portions of all creeks addressed in this alternative. Similarly, Alaska Native prehistoric sites have been found along two of the creeks in this alternative, in spite of the almost complete lack of archaeological surveys aimed towards finding such sites in the project area. There are almost certainly more such sites.

Environmental Consequences

Section 3.1 of this document describes the nature of the proposed hardrock mineral leasing. Alternative D outlines disturbance of up to: 507 acres by mechanized placer mining operations, 70 acres from the issuance of exploration licenses, and 84 acres by suction dredging in and alongside specified creeks (including Ophir, Bear, Trail, Quartz, Champion, and Little Champion creeks).

Surface disturbing activities, including mining and exploration activities outlined here, directly and adversely impact cultural and paleontological resources. Disturbance to prehistoric sites by any particular mining or exploration operation would need to be assessed on a case-by-case basis. Their locales on the landscape are a bit more predictable than are historic mining sites. In sum, hardrock mineral leasing would likely directly and adversely impact all manner of surface and buried cultural and paleontological resources.

Similarly, new access roads might be authorized to reach future valid mineral leases. New road construction has a direct and adverse effect on cultural and paleontological resources. It also has an indirect effect when new users (such as recreators, hunters, and those interested in procuring forest and woodland products) gain access to previously isolated lands. With more resource users accessing BLM-managed lands, the potential increases for more people finding surface cultural resources and adversely impacting them, whether intentional or not.

Cumulative Effects

Cumulative impacts to cultural and paleontological resources can occur through incremental degradation of the overall resource base. Excepting especially rare or unique sites, the destruction of any one, two, three, or more sites would likely not impact the overall, areal resource base, as there would probably be more of any similar type of site elsewhere in the planning area. However, cultural and paleontological resources are a non-renewable resource and the loss of any one of them is one less from a finite total. There would eventually be a point at which the cumulative overall destruction of sites would limit management options within any defined area, such as the planning area. Hardrock mineral leasing in the White Mountains would contribute to this cumulative effect.

Many low-level, seemingly minor impacts (such as walking or camping on a site) can slowly and cumulatively grow into a larger direct adverse effect over time. Similarly, visitors to sites

often feel an urge to connect with the past by removing a piece of the site when they leave, like an artifact. Removal of a one, two, three, or more artifacts would not likely affect overall site interpretation. However, the point would come when enough artifacts are removed, that the cumulative removal would irreversibly affect any interpretations that can be made about that site. By promoting and increasing use and visitation upon public lands, hardrock mineral leasing may inadvertently adversely impact cultural and paleontological sites in this cumulative manner.

3.2.2. Fish and Aquatic Species

Methods of Analysis

Indicators: For aquatic resources, fish, and Special Status Species, the indicators used to identify the level of impact include water quality, riparian vegetation, streambank stability, and stream miles open to leasing of hardrock minerals.

Methods and Assumptions: Potential impacts on fish and aquatic resources are based on interdisciplinary team knowledge of the resources and the planning area. Impacts were identified using best professional judgement and were assessed according to the following assumptions:

- Healthy riparian areas are critical for properly functioning aquatic ecosystems. Improvements or protection of riparian habitats would indirectly improve or protect aquatic habitats and fisheries. Adverse impacts to riparian habitats would indirectly degrade aquatic habitats and fisheries;
- All of the anadromous streams or extent of anadromy within the area proposed for hardrock mineral leasing may not yet be identified;
- A hardrock mineral leasing program would result in an increased number of placer mining operations with the potential to adversely affect fish and aquatic resources, including BLM-Alaska watch list species and the outstandingly remarkable fisheries value for Beaver Creek;
- All BLM land use authorizations would incorporate appropriate project design, Procedures, and mitigation to ensure no adverse long-term (greater than 20 years) impacts to water quality and aquatic habitats exist.
- The BLM would identify channel reconstruction activities. Reconstructed stream channels would be designed by an individual(s) trained and qualified for the task and the channel would be built as designed.
- Reclamation techniques would use an “adaptive management” approach to address potential problems allowing for corrective actions should they become necessary. These techniques would ensure applicable performance standards and required conditions are met at the conclusion of operations.
- The timeframes associated with long- and short-term impacts assume that channel equilibrium is maintained.

Affected Environment

A general description of fish and fish habitat within the Eastern Interior Planning Area, including areas specific to Alternative D, is in section 3.2.4.1 of the Eastern Interior Draft RMP/EIS (BLM 2012a) and is incorporated by reference. The planning area supports 17 native fish species. None of these species are listed as threatened or endangered. With few exceptions, the current condition of fish species is good, and most fish populations are self-sustaining.

Approximately 160,000 acres are recommended open to hardrock mineral leasing in Alternative D, including 250 miles of headwater streams located in the southeast portion of the White Mountains NRA. These streams form the headwaters of Beaver Creek WSR (Figure 2.1). These headwater streams are clear, rapid streams with long riffles, few pools, with an average width of 50 feet (Rhine 2005). The substrate generally consists of a gravel-cobble mixture (3 to 12 inches in diameter). Although some placer mining activity has occurred in headwater areas of Beaver Creek, most of these streams are thought to be in pristine condition, with the exception of Nome Creek. Nome Creek was heavily placer mined for gold from the early 1900s to the late 1980s. Mining disturbed more than seven miles of stream and by the 1980s the floodplain was largely obliterated (Kostohrys 2007). From 1991 to the present, the BLM has been working to restore the floodplain, reestablish riparian vegetation, and maintain a single thread channel. The BLM has expended an estimated \$450,000 on the Nome Creek reclamation project (USKH 2006).

Fish species found within the upper Beaver Creek watershed that are adjacent to or within areas recommended open to mining include Chinook salmon (*Oncorhynchus tshawytscha*), Arctic grayling (*Thymallus arcticus*), whitefish (*Coregoninae spp.*), and slimy sculpin (*Cottus cognatus*). Beaver Creek also supports regionally significant fish species which include small populations of coho (*O. kisutch*), and summer chum salmon (*O. keta*). The creek also supports moderate to high densities of Arctic grayling and northern pike (*Esox lucius*) which provide important recreational fishing opportunities. These populations of regionally significant fish species, unique concentrations of Arctic grayling, and the river's pristine habitat support BLM's identification of fish as an Outstanding Remarkable Value ([ORV](#)) for Beaver Creek (BLM 2012a, Appendix E).

The BLM monitored Beaver Creek Chinook salmon escapement from 1996 to 2000 and the data revealed a declining trend similar to the overall decline of Yukon River Chinook salmon (Volk et al., 2009). The Beaver Creek Chinook salmon escapement for these years ranged from 114 to 315 Chinook salmon. Although Beaver Creek Chinook salmon were designated as a BLM-Alaska sensitive species in 2004 due to the downward trend of this small population, they were recently removed from that list and placed on a watch list. Since 2000, the Alaska Department of Fish & Game (ADF&G) has considered the Yukon River Chinook salmon stock as a *stock of yield concern* based on escapement performance, expected yields, and harvestable surpluses (Howard et. al. 2009). Beaver Creek Chinook are a component of the Yukon stock. Between 1996 and 2000, the overall Yukon River Chinook escapement range from the highest (about 300,000) to the lowest (about 100,000) dating back to 1982. Beaver Creek contributes a small percentage of the overall Yukon River Chinook salmon stock. The Yukon stock, however, is made up of numerous genetic stocks (such as the Beaver Creek stock) all of which are considered important to the overall health and viability of the stock.

The [ADF&G](#) Anadromous Water Catalog identifies Chinook salmon spawning and rearing in Beaver and Ophir creeks and Chinook spawning in Nome Creek (Figure 3.1). Adult Chinook salmon in spawning condition have been observed at the confluence of Bear and Champion Creek (E. Yeager, pers. comm. May 15, 2012). That location is many miles farther upstream than what the Anadromous Waters Catalog identifies as the extent of anadromy. This reinforces ADF&G's assumption that approximately 50 percent of the anadromous streams or extent of anadromy have not yet been identified.

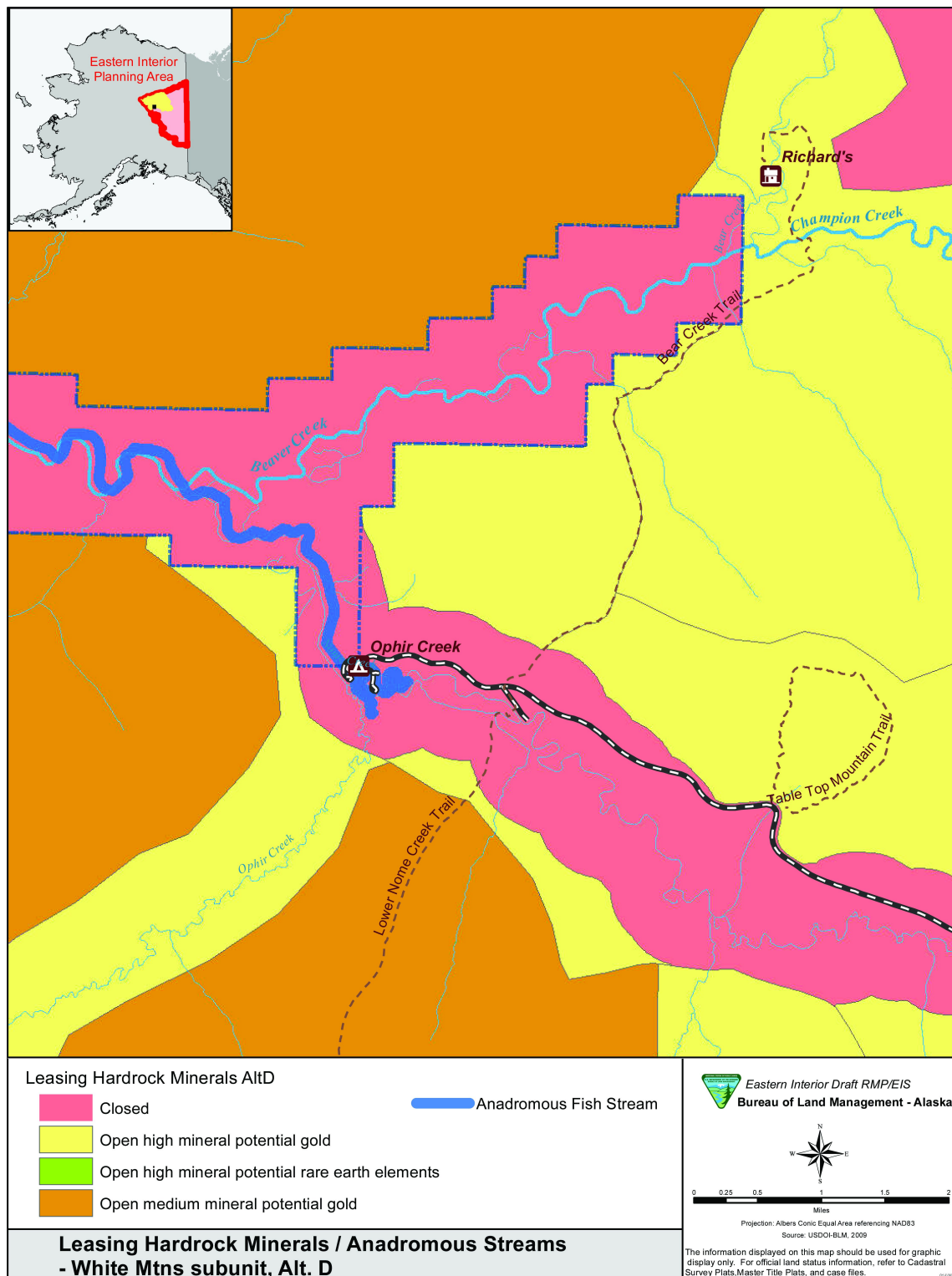


Figure 3.1. Map of Anadromous Streams in Headwaters of Beaver Creek

The excellent opportunity for Arctic grayling fishing was one of the values identified for establishing Beaver Creek as a component of the National Wild and Scenic Rivers System (BLM 1983). In 2000, the BLM and [ADF&G](#) performed an Arctic grayling study on the upper 30

miles of Beaver Creek, including the area between the confluence of Bear and Champion creeks and the confluence of Nome Creek (Fleming et al., 2001). This study estimated the population density of Arctic grayling at 1,325 per mile, which is higher than other studies on summer feeding populations in Alaska by as much as 44 percent. The study also revealed an increase in the size of grayling as the study moved upstream to the headwaters of Beaver Creek. This pattern was reinforced by other studies that found large male Arctic grayling migrating from downstream areas to Bear and Champion creeks during late May and June, while females and smaller males move into these areas during July and August (Rhine 1985). Within the upper 100 miles of Beaver Creek, the headwater streams (e.g., Bear and Champion creeks) have produced the largest and oldest Arctic grayling based on BLM and ADF&G fish sampling efforts and reports from recreational anglers (T. Dupont, pers. comm., May 22, 2012). This pattern reflects the generally accepted life-history paradigm for Arctic grayling that larger and older fish spend the summer feeding period in headwater areas and tributaries of rapid runoff rivers in Alaska (Armstrong 1982). Although Arctic grayling primarily use the headwater streams for summer feeding, some evidence of spawning has been observed (Rhine 1985; Kretsinger 1986) and may justify future inventory work.

Environmental Consequences

The effects on fish and aquatic habitats of mining (and exploration) for hardrock minerals in the White Mountains Subunit under mineral leases would be similar to those described for locatable mineral development in other parts of the planning area. These effects are described in section 4.3.1.4 of the Eastern Interior Draft RMP/EIS (BLM 2012a) and are incorporated by reference.

Suction dredging, a type of placer mining, can have both beneficial and adverse effects on fish and aquatic habitat depending on the timing and location of the activity.

Suction dredging has been shown to locally reduce benthic (bottom dwelling) invertebrates (Thomas 1985; Harvey 1986), cause mortality to early life stages of fish due to entrainment by the dredging equipment (Griffith and Andrews 1981), destabilize spawning and incubation habitat, remove large roughness elements such as boulders and woody debris that are important for forming pool habitat and that can govern the location and deposition of spawning gravels (Harvey and Lisle 1998), increase suspended sediment, decrease the feeding efficiency of sight-feeding fish (Barrett et al., 1992), and reduce living space by depositing fine sediment (Harvey 1986).

Conversely, suction dredging may temporarily improve fish habitat by creating deep pools or by creating more living space by stacking large non-embedded substrate (Harvey and Lisle 1998; Figure 1,2). In dredged areas, invertebrates and periphyton are known to recolonize relatively rapidly, as long as the disturbance area is sufficiently limited to maintain populations of recolonizing organisms (Griffith and Andrews 1981; Thomas 1985; Harvey 1986). In addition, dredge tailings may increase spawning sites in streams lacking spawning gravel or streams that are armored by substrate too large to be moved by fish (Kondolf et al., 1991). In some cases, reduced visibility caused by elevated levels of turbidity can diminish the feeding efficiency of fish, while at the same time the reduced visibility may lessen the risk of predation (Gregory 1993).

Suction dredging operations within the Steese Subunit have been known to adversely impact streambank stability as well as riparian and stream channel function. Although disturbance to streambank and riparian habitats and alterations to the stream course is prohibited for suction dredging operations, in some cases these areas have been impacted. This type of activity results in an overwidened and shallow stream course, which is braided around stacked piles of large

substrate. These impacts adversely affect riparian and stream function and if not reclaimed may persist for extended periods of time (years/decades) due to the amount of stream energy required to redistribute this large-sized substrate in the stream channel. It is assumed that these situations would be limited and that lease and license stipulations would minimize the level and duration of impacts to aquatic resources.

The anticipated number of suction dredging operations during the life of this plan is 11 (Table 3.1). There would be 250 miles of stream open mineral leasing with an anticipated disturbance of 84 acres, or 14 miles of stream. Suction dredging operations are anticipated to disturb 22,000 cubic yards of stream gravel over the life of this plan or the equivalent of 2,200 typical (10 cubic yard) dump truck loads of stream gravel. Impacts from suction dredging operations that do not alter streambank stability or adversely impact riparian and stream channel function, and adhere to stipulations in the suction dredge permit, are likely to be minimal and of short-term duration (less than or equal to five years).

Mechanized Placer Leases – Conventional Mining

For Alternative D, fish and aquatic resources would be primarily affected by surface-disturbing activities which alter stream channels and floodplain connectivity, remove or impair riparian vegetation and function, or result in soil erosion and sedimentation to fish and aquatic habitat. These activities would include mechanized placer mining and associated road construction that occur within or adjacent to riparian areas or waterbodies.

Conventional mechanized placer mining involves the use of heavy equipment to access gold deposits. One method of mine development is to move the stream into a bypass channel, while the original stream channel is excavated for gold deposits. During this process the streambed, streambanks, and riparian vegetation are physically removed in order to access gold-bearing fluvial deposits which may extend to the bedrock. This method destroys the existing fish and aquatic habitat and eliminates all biological stream functions. Impacts to fish and aquatic resources can be severe and last for decades under the stream-altering bypass method (Tidwell et al., 2000, Arnett 2005, Viereck et al., 1993; Milner and Piorkowski 2004; BLM 1988 a, b, and c). Soil erosion from large surface disturbing activities (such as mechanized mining) often results in poor water quality and elevated turbidity levels harmful to fish and fish habitat far beyond the impact site. The River Management Plan for Beaver Creek National Wild River (BLM 1983c) stated that placer mining activities in the headwaters of Beaver Creek resulted in turbid water conditions as far as 30 miles downstream. Surface management regulations have since changed, in part to reduce adverse impacts to water quality from mining. The severity and duration of impacts are substantially reduced when mining operations occur outside of the stream channel and active floodplain.

The anticipated number of mechanized placer mining leases during the 20-year life of this plan is 13 (BLM 2012b). Approximately 250 miles of stream would be open to leasing for mechanized placer mining with an anticipated amount of disturbance of 507 acres. This disturbance would likely occur within floodplain areas and/or in the stream channel. In an attempt to quantify the number of stream miles that may be directly impacted by leasing, the length of a typical mining claim block (660 feet) from other subunits was used. The anticipated number of stream miles directly impacted by leasing would be eight miles. The likelihood of impacts would be greatest in the high development potential areas, which, contain more than half of the stream miles open to mechanized leasing.

If mining did occur, the ROPs specific to fish and aquatic species ([Appendix A](#)) would improve the likelihood of obtaining desired future conditions for aquatic habitats within an accelerated timeframe after reclamation. A range of success would be expected based on several factors. These factors include baseline data collection, stream channel design/construction technique, the reclamation measures specified for the particular operation, the watershed characteristics, the capability of the site to revegetate, and the probability of experiencing a flood event prior to the reestablishment of riparian vegetation that is capable of dissipating stream energy and preventing erosion.

Assuming that baseline data is collected, reclamation is designed using the best available techniques such as those outlined in the Natural Resources Conservation Service's (NRCS, 2007) *Stream Restoration Design, National Engineering Handbook, Part 654*, and all of the factors previously mentioned are favorable, it is likely that instream habitats would rehabilitate within five years following reclamation. In these cases, impacts would be expected to be minor and short-term. However, stream channel design/reconstruction and aquatic habitat rehabilitation is very complex, especially within the planning area due to the harsh environmental conditions (such as short growing season, albedo) and limited availability of hydrography data. Recognizing this complexity, a more realistic outcome may be a strong positive trend toward the desired habitat conditions within five to ten years under this management scenario. It would be essential that reclamation plans incorporate stream channel design based on channel forming discharge (typically a 1.5 year recurrence interval) and the floodplain be capable of transporting 100-year flood flows. This would minimize the chance of reclamation failure and the need for subsequent reclamation work by the operator.

In summary, placer mining can negatively affect fish and aquatic resources by degrading or eliminating aquatic habitat; reducing available food sources and water quality; reducing available pool habitat; eliminating riparian vegetation and function; creating sparsely vegetated valleys and floodplains with slow rates of natural revegetation and unstable stream channels with highly erodable beds and banks; altering the longitudinal slope, geometry, and sediment transport rates in streams; and, creating undersized or absent floodplains.

Mineral Exploration Licenses

It is anticipated that there would be four placer exploration licenses and one lode exploration license. Placer exploration licenses may encompass 20,000 acres with an anticipated disturbance and reclamation of 20 acres over the 20-year life of this plan. The impacts to fish and aquatic resources would vary depending on the location, type of exploration activities, and subsequent reclamation, all of which would be analyzed during a site-specific NEPA analysis prior to approval of exploration licenses and exploration plans.

Potential adverse impacts would likely be from surface erosion of disturbed soils and the destruction of riparian vegetation resulting in elevated turbidity levels and sedimentation to nearby water bodies. The effects of excess sediment and the removal of riparian vegetation to fish and aquatic resources is described in section 4.3.1.4.1 of the Eastern Interior Draft RMP/EIS, which is incorporated by reference. Although sediment is a natural part of the aquatic ecosystem, an increase in fine sediment has the potential to affect the availability of food, predator avoidance, immune system health, and reproduction of fish and aquatic species. The ROPs ([Appendix A](#)) should reduce impacts from exploration to a negligible level with short duration given the anticipated level of disturbance from exploration activities. The larger the surface disturbance and the closer it is to the stream, the greater the severity and duration of the impact.

It is anticipated that one lode exploration license would be requested in the Roy Creek REE deposit, resulting in 50 acres of disturbance. While it is unlikely that fish or fish habitat studies have ever been performed in the headwaters of Roy Creek, it is reasonable to conclude that fish may not be present in the headwaters of this relatively small, high gradient stream. Direct impacts from lode exploration are not anticipated. Potential indirect adverse impacts from surface erosion would be similar to those described above for placer exploration activities.

Previous surveys in the Roy Creek area indicate that the soils are mainly of the granitic type (John Hoppe, pers. comm. May 10, 2012) that pose little threat to fish and aquatic life when disturbed and exposed to air and water. Although unlikely, if soils containing sulfide bearing ore were disturbed and exposed to air and water during exploration activities, acid mine drainage may occur and result in adverse indirect impacts to downstream waters. Acid mine drainage can cause physical, chemical, and biological degradation to aquatic habitat (Jennings et al., 2008). Predicting the risk of acid mine drainage at mine sites is often inaccurate (Jennings et al., 2008). It will be necessary to collect site-specific information variables and data to predict the potential for acid mine drainage in the Roy Creek area.

Outstandingly Remarkable Values and Watch List Species

As noted previously, the Arctic grayling fishery was one of the values identified when Beaver Creek was established as a component of the National Wild and Scenic Rivers System (BLM 1983c). Fish are currently proposed as an outstandingly remarkable value for Beaver Creek (BLM 2012a, Appendix E). As such, fish habitat within Beaver Creek and its tributaries in the White Mountains [NRA](#) have been managed to maintain and/or enhance fish populations with an emphasis on Arctic grayling (BLM 1986). Similarly, a major goal for the NRA is to protect and maintain the water quality of Beaver Creek to meet state water quality standards and promote a quality fishing experience (BLM 1986b). Mechanized placer mining within the floodplain and/or stream channels of Beaver Creek's principal tributaries would not maintain or enhance fish habitat and populations or water quality. The White Mountains NRA Record of Decision and Resource Management Plan (BLM 1986b) states that "Extensive placer mining on Beaver Creek or its principal tributaries would be in conflict with recreational purposes because of degradation to natural and primitive values of the Beaver Creek National Wild River corridor and damage to Arctic grayling habitat". It also states that sport fishing on Beaver Creek contributes to public enjoyment of the NRA and fish habitat in tributary streams should be protected because they contribute to fish populations in Beaver Creek.

Beaver Creek Chinook salmon are currently a BLM Watch List species (BLM 2010). This species should be emphasized for additional inventory, monitoring, or research efforts to better understand the population or habitat trends. Beaver Creek Chinook salmon are a component of the Yukon River Chinook stock, a *stock of yield concern* since 2000 (Howard et al., 2009). Beaver Creek Chinook salmon spawn and rear immediately downstream and potentially within the area proposed for opening to conventional mining (Figure 2.1). The adverse impacts from mechanized mining, including the downstream effects and habitat degradation, could cause the Beaver Creek Chinook to become designated as a BLM-Alaska Sensitive Species.

Cumulative Effects

Cumulative impacts to fish and aquatic resources consist of past, present, and reasonably foreseeable future impacts, including impacts on non BLM-managed lands. Hardrock mineral

leasing in Alternative D would add to cumulative impacts from exploration and development of locatable and leasable minerals elsewhere in planning area, including on state and private lands.

Fish and aquatic resources have been adversely impacted from past mechanized mining activity in the Beaver Creek drainage. The majority of these impacts occurred from 1900 until the mid-1980s in Nome Creek, where extensive mining for placer gold obliterated seven miles of stream and floodplain (Kostorhys 2007). This activity resulted in the direct loss of fish habitat and sediment pollution to Beaver Creek. Although habitat conditions in Nome Creek have greatly improved from nearly 20 years of reclamation work by the BLM, desired conditions for aquatic habitat have not yet been achieved (desired future conditions are described in section 2.4.1.3 of the Draft RMP/EIS, BLM 2012a). Portions of Nome Creek have not been reclaimed and are not likely to be in desired condition for aquatic habitats. Mechanized mining activities have also occurred in other tributaries, but to a much lesser extent. There are no known current mining activities in the Beaver Creek drainage.

A hardrock mineral leasing program would open 160,000 acres to the leasing and exploration of formally locatable minerals in the White Mountains NRA with an anticipated disturbance of 661 acres and eight miles of stream. Suction dredging activities may impact 14 miles of stream. Past and future mechanized mining proposed in this alternative may result in approximately 20 miles of stream within the [NRA](#) that would not meet the desired conditions for aquatic habitats. Cumulative impacts specific to the NRA would be in addition to the cumulative impacts described in section 4.3.1.4.2. of the Eastern Interior Draft RMP/EIS (BLM 2012a). Cumulative impacts from Alternative D, would have the greatest potential for adverse impacts to fish and aquatic resources relative to the other alternatives.

3.2.3. Non-Native Invasive Species

Alternative D also allows the most latitude to OHV use and rights-of-way and would result in the greatest disturbance to soil and vegetation in the areas recommended open to hardrock mineral leasing. This would create the greatest potential for the introduction of nonnative invasive plant species (NIP) within the White Mountains NRA. Equipment imported for mineral exploration and development activities often harbor seeds of invasive species that could dislodge and germinate at these remote sites.

The reasonable foreseeable development scenario (RFD) forms the basis for evaluating the impacts to resources ([section 3.1](#)) from hardrock mineral leasing. The total disturbance over the life of the plan is expected to be 661 acres from all hardrock leasing and exploration licenses, a relatively small portion of the 160,000 acres open to exploration and development. Assuming that exploration and development occurs throughout the open area, invasive plant species could be introduced in a dispersed rather than concentrated pattern, complicating control and containment.

The [RFD](#) includes the assumption that 20 miles of roads would be built in support of new placer developments. The roads are linear vectors for the introduction and spread of invasive plants into these remote areas. Seeds from infestations along roads can move along other intersecting linear features, such as trails and waterways, further spreading undesirable nonnative species into remote areas. For example, infestations of white sweetclover (*Melilotus officianalis*) have been documented on sand bars along the Nenana River, spreading from source populations upstream (Conn et al., 2008). Section 4.7.1.3.4 of the Eastern Interior Draft RMP/EIS (BLM 2012a), which is incorporated by reference, contains analysis of rights-of way development in the White

Mountains NRA for Alternative C. Impacts identified in this section apply to the roads in support of new placer developments analyzed in this supplement.

Any natural or human-caused disturbance to the landscape provides an opportunity for NIP to become established. Equipment, watercraft, vehicles, and gear may harbor seeds that may then be transported to project sites. Climate change may accelerate the ability for [NIP](#) to become established (Rupp and Springsteen 2009). More general information about vectors and impacts from introduction and spread of nonnative invasive plants are in Chapter 4 of the Eastern Interior Draft RMP/EIS (BLM 2012a). This information is incorporated by reference. Section 4.3.1.5 discusses effects common to all subunits. Section 4.7.1.3 of the Draft RMP/EIS contains analysis of impacts for locatable minerals on 4,000 acres of valid existing rights outside the NRA and other decisions, but assumes no hardrock leasing within the White Mountains NRA. Impacts from hardrock mineral leasing would be similar to those from locatable mineral exploration and development.

ROPs and Leasing Stipulations in Appendix A of the draft RMP/EIS and those modified in this supplement (shown in [Appendix A](#) of this document) to mitigate impacts from hardrock mineral leasing would be applied on a case-by-case basis to leases and exploration licenses. ROPs in [section A.2.10](#) of this document specifically address eliminating or minimizing the introduction and spread of NIP by prescribing standards for vegetation treatment, revegetation with native plants, reclamation for roads and trails, and salvage of vegetative mat and topsoil. Other ROPs in Appendix A would also help limit the introduction and spread of NIP.

Nonnative invasive species other than plants may be introduced by exploration or development when equipment from Canada or other parts of the United States are imported to the work sites. This equipment can harbor insect eggs, larvae, pupae, adult or other viable life cycle stages and other undesirable pathogens and pests. Little documentation exists that invasive species other than plants have been introduced into Interior Alaska. Over the life of the plan where there may be concerns about other invasive species, however, permit stipulations to mitigate introduction of insects, other pests and pathogens would be developed on a case-by-case basis.

Indirect impacts would result where [NIP](#) become established due to hardrock exploration development, including potentially long-term changes in plant community structure and diversity and wildlife habitat degradation. Costs include long-term monitoring and control. Containment and control of NIP for the long-term may also include further soil disturbance and the application of herbicides.

Cumulative Effects

Cumulative effects of past, present and reasonably foreseeable actions that are common to all for nonnative invasive species have been developed in section 4.3.1.5.2 of the Eastern Interior Draft RMP/EIS (BLM 2012a). Cumulative effects specific to the White Mountains Subunit for nonnative invasive species are in section 4.7.1.3.6. The combination of the removal of vegetation for exploration and development, increased disturbance of riparian vegetation and bank stability from multiple stream crossings, user-created trails, new support roads in the southeast portion of the White Mountains NRA, and present and potential future actions on adjacent federal, state and private lands increases the footprint for NIP to become established and spread from adjacent development into the relatively weed-free NRA. Ongoing climate change is expected to result in an increase in the number of nonnative species that can become established in subarctic areas due to longer frost-free season and thawing of permafrost. Changes in precipitation projected

for the Eastern Interior may also benefit invasion by [NIP](#) that outcompete native plants and alter wildlife habitat.

3.2.4. Soil and Water Resources

Compared to other alternatives, Alternative D would result in the greatest disturbance to soil resources and adverse impacts to water quality because selected areas (Figure 2.1) would be open to hardrock mineral leasing. Ongoing climate change would also affect these resources and may increase the magnitude of effects from mining.

Anticipated disturbance in the White Mountains [NRA](#) is estimated at 507 acres by mechanized placer mining operations, 20 acres associated with the issuance of placer exploration licenses, 50 acres from the issuance of rare earth element exploration licenses, and 84 acres of disturbance from placer gold suction dredging in areas with high placer gold potential, including Ophir, Bear, Quartz, Champion, Little Champion and Moose creeks. Mining activities would be limited to approximately 160,000 acres in areas of known historic mineral activity in the south/southeast part of the White Mountains NRA. Lands within one-half mile of Nome Creek would be closed to leasing because of long-term ongoing stream reclamation as well as parcels of wetland acreage committed in perpetuity as U.S. Army Corps of Engineers compensatory wetland mitigation acreage.

Disturbance to soil and water resources by any particular mining or exploration operation would need to be assessed on a case-by-case basis. Impacts to soil and water resources vary depending on the development methods used, size of the operation, and number of mines. Because 160,000 acres would be open to mineral development under Alternative D there would be increased potential for adverse impacts to soil and water resources. Impacts would be reduced through application of ROPs and site-specific analysis of subsequent authorizations.

Effects from Mechanized Placer

Probable impacts to soil and water resources from placer mining were described in detail in the Beaver Creek Placer Mining Final Cumulative [EIS](#) (BLM 1988b). Impacts can vary considerably depending on factors including site characteristics, size of the disturbed area, and mining methods. Where placer mining operations utilize heavy equipment, the following impacts could be expected.

Placer mining can have an adverse effect on the existing soil profile structure by stripping of overburden and riparian/wetland vegetation. The usual procedure is for the overburden (including organic materials) to be stripped, coarse underlying materials separated from gold-bearing material in the processing plant, and fine materials discharged to a series of settling ponds with recycled water used by the processing plant. There is an irretrievable loss of any soil that enters waterways and is transported downstream.

Erosion of soils from non-point sources typically contribute to the sediment load of stream systems and may result from stream crossings, roadways directly adjacent to stream channels, improved roads and trails which converge down-gradient to stream channels.

The primary impact to water quality from mining is an increase in sedimentation and turbidity. Some direct effects on water quality can be anticipated during the development stage of an operation due to the construction of settling ponds and stream bypasses, and through

re-channelization of the stream. This would result in short-term increases in sediment levels and turbidity while equipment operates near or in the active stream channel.

Leasees would be required to meet Alaska Department of Environmental Conservation water quality standards and acceptable discharge standards available online at <http://dec.alaska.gov/commish/regulations/index.htm>. It is anticipated that turbidity as a result of direct and indirect discharge from placer mine operations would meet [ADEC](#) water quality standards. However, it is likely that occasional high water or failure of water control structures would introduce sediments collected by the water treatment system into the stream channel. This would result in short-term increases in turbidity and sediment load levels and possible localized sedimentation of the stream substrate. The degree of impact would depend on the amount of material released and the streamflow at the time of release.

Stream channel morphology would be directly affected in all areas where activities associated with mining occur in the active channel; by-pass channels are usually constructed to allow mining in the active channel.

Indirect impacts to water quality would occur through non-point source erosion from disturbed areas associated with placer operations including access road and trails and equipment staging areas directly adjacent to stream channels. Channel readjustment would occur where the active channel was modified. These processes increase suspended sediment into the stream system, particularly during spring break-up and floods.

The impacts to soil and water resources could be expected to decrease after cessation of mining, successful revegetation of the disturbed areas, and stabilization of the disturbed channel. It is estimated that reestablishing vegetation on placer waste rock piles may take decades. The rate of succession (revegetation) seems to be heavily influenced by the proportions of particles of silt and clay size in the surface layer of the tailings (Rutherford and Meyer 1981).

ROPs ([Appendix A](#)) have been developed to reduce impacts to soil and water resources that may result from hardrock mineral leasing activities. Additional mitigation measures, if necessary, could be developed during [NEPA](#) analysis of specific mineral leases or exploration licenses. Water quality monitoring requirements (Wagner et al., 2006) would be defined through this process.

Daily stream flow and water quality is currently monitored on lower Nome Creek and on Beaver Creek near its confluence with Victoria Creek to document daily, annual, and long-term variation in flows and water quality. The BLM would continue to monitor water quality and in-stream flow in selected streams and lakes to ensure that state water quality standards were met and to document changes in stream flow. Activities expected to adversely alter natural flows would not be permitted.

Effects from Suction Dredging

Suction dredge mining activities have the potential to affect soil and water resources, particularly if operations require access over steep terrain or permafrost soils where surface disturbance may result in increased erosion. Adverse impacts could result from equipment transport and storage, fuel spills, unauthorized expansion of existing trail networks, as well as from compaction of soils at long-term camping sites associated with suction dredge mining operations.

In Interior Alaska a majority of the suction dredge operations occur in the Fortymile River area. The USGS conducted a systematic water quality study of the Fortymile River and many

of its major tributaries in June of 1997 and 1998 (Wanty et al., 1999). Surface-water samples were collected for chemical analyses to establish regional baseline geochemistry values and to evaluate the possible environmental effects of suction-dredge placer gold mining and bulldozer-operated placer gold mining (commonly referred to as cat-mining). They concluded, based on water-quality chemistry and turbidity data, that the suction dredges had no apparent impact on the Fortymile River system, although possible effects on biota were not evaluated. One of the three cat-mining operations monitored, however, had adverse impacts on local water quality and streambed morphology.

Cumulative Effects

Cumulative impacts to soil and water resources consist of past and current impacts in addition to reasonably foreseeable future impacts, regardless of whether these impacts were from private, state, or federal actions. Any proposed resource development involving surface disturbance has the potential to cumulatively impact soil and water resources. Incremental cumulative degradation of soils and water resources within a watershed can occur, for example, through mining operations on selected stream segments. For each individual mining operation a small direct loss of soil and some small degradation of water quality are likely. As the number of mining operations increase in a given watershed the cumulative soil loss and cumulative impact to water quality can have long-term adverse impacts on soil stability, riparian habitat, fisheries habitat and water quality.

Cumulative impacts can also result from repetitive use of an area, such as a single [OHV](#) stream crossing along a user-created trail. Minor disturbance may result from a single crossing, however, multiple use of an unimproved OHV stream crossing site can result in substantial cumulative impacts including soil compaction, damage to riparian vegetation, erosion along user-created trails and potential decrease in bank stability and local water quality.

Placer mine development has occurred in the Steese-White Mountains area since the early 1800s using a variety of mechanized methods including dredges, draglines, dozers, and excavators. The soil profile is typically destroyed for long periods in areas of active dredging or sluicing, with shorter-term impacts of soil compaction and alteration in areas of facilities, roads, and trails. Water quality is often degraded by increased siltation depending on site characteristic and the type of mining operation.

The total disturbed area from historic placer activity on BLM-managed lands in the planning area is estimated at 7,500 acres, with less than 500 acres likely disturbed by past mining activity in the White Mountains. Alternative D of the Draft RMP/EIS would recommend opening selected areas to mining, potentially resulting in development of new access roads and mine operations. A portion of this projected mining, however, would likely occur in previously mined areas. Development of an estimated 61 small-scale (20 to 30 acres) placer mines and eight large-scale (60 to 80 acres) would be expected on BLM-managed land under Alternative D, all outside of the White Mountains [NRA](#). The addition of a hardrock mineral leasing program in the White Mountains NRA would potentially add two large-scale placer mines, 11 small-scale placer mines, and 11 suction dredging operations in the White Mountains. This level of activity is projected to add an additional 661 acres of new disturbance in the NRA.

In its 2007 Mineral Industry Report, the Alaska Division of Geologic and Geophysical Surveys (DGGs), lists 81 separate companies or individuals that were estimated to be producing gold in the planning area (Szumigala et al., 2008). The amount of acreage on state and private land that has been disturbed or reclaimed by mining operations within the planning area is uncertain.

Two large scale lode mines, Pogo and Fort Knox, are in operation on state lands within the planning area. One potential lode mine, “Money Knob”, is located near the town of Livengood along the western boundary of the White Mountains subunit. If potential lode mines are developed, varied impacts to soil and water resources would be expected depending on the type of mine development and ore processing methods.

3.2.5. Special Status Species

Wetland, riparian, and aquatic habitats support most of the BLM-Alaska sensitive animal species. Olive-sided flycatcher, blackpoll warbler, rusty blackbird, Alaskan brook lamprey, Alaska endemic mayfly (*Rithrogena ingalik*), a mayfly (*Acentrella feropagus*), and a stonefly (Alaska sallfly, *Alaskaperla ovibovis*) are BLM-Alaska sensitive species that are dependent on these habitats and may occur in the hardrock leasing area, or downstream in areas potentially affected by hardrock leasing activities. The Alaska tiny shrew (*Sorex yukonicus*) may also occur more frequently in riparian habitats. Placer mining and associated changes in access could result in substantial localized impacts to riparian and aquatic habitats and species, if the species occurs in or downstream of the area of disturbance. Rangewide impacts are unlikely to be substantial. Reclamation requirements for riparian and aquatic habitats should increase reclamation success and reduce impacts for sensitive species occurring in these habitat types.

Olive-sided flycatcher, blackpoll warbler, and rusty blackbird are found in the White Mountains in low densities. These species are widely distributed in the planning area. All are associated to some extent with riparian or wetland habitats. ROPs that minimize impacts to riparian and wetland habitats through reclamation would reduce impacts over the long-term. Occurrence of these species in other habitats and areas is dispersed enough that anticipated activities are unlikely to impact any of them at a population level.

Alaskan brook lamprey is found in the Chatanika River, near the Elliott Highway bridge close to the Beaver Creek drainage in the White Mountains NRA, but is not known to occur on BLM-managed lands. Alaska endemic mayfly, a mayfly, and Alaska sallfly are not currently known to occur in the Beaver Creek headwaters or the White Mountains NRA, but data on distribution is extremely limited. It is not known how much of these species habitat, if any, is encompassed by the hardrock mineral leasing area, but disturbance of up to 591 acres of riparian habitats within the headwaters of Beaver Creek is not expected to result in impacts at the population level nor cause a trend toward federal listing for any of these species.

The Alaska tiny shrew occurs in low density within a variety of habitats, but is most common in riparian shrub habitats. It has been documented to occur in the Steese National Conservation Area near Twelvemile Summit. Widespread activities that clear large areas of vegetation could negatively impact this species. Mining could have localized effects to shrew habitat, but given the variety of habitats used and the low level of disturbance anticipated, would not likely occur at a scale or degree to cause a trend toward federal listing.

Most BLM-Alaska sensitive plant species occur in habitats with specialized conditions, such as: steep south-facing dry bluff habitats; moist alpine herbaceous sites; rocky ridges, slopes, and scree; and, calcareous rocks or soils. Four species are known to occur in the White Mountains: *Douglasia arctica* is known from Mount Schwatka, Victoria Mountain and VABM Fossil (Parker et al., 2003); *Poa porsildii* found in the Lime Peak and VABM Fossil areas; *Ranunculus camissonis* collected in the Lime Peak area; and, *Trisetum sibiricum* collected from below Mount Schwatka and on Lime Peak. Although not documented, there is a potential for BLM-Alaska

sensitive plant species to occur in the mineral leasing area, particularly on the ridge between Quartz, Bear, and Champion creeks and in the Roy Creek [REE](#) deposit. There is less potential for these species to occur in creek bottom habitats where placer mining would occur. Given the habitat preferences for these species, the highest potential for impacts would be from REE mineral exploration activities. Exploration activities would result in minimal surface disturbance and impacts would be localized at drilling or trenching sites. [ROPs SS-2 and SS-3](#) which require site-specific measures, such as avoidance, to protect sensitive plant species populations or individuals would further reduce the potential for direct impacts.

Hardrock leasing would impact individuals of some BLM-Alaska sensitive species, the distribution of which are generally not well-known. Hardrock mineral leasing in the White Mountains [NRA](#) would result in greater impacts to sensitive species relative to Alternatives A, B, and C, and would add to cumulative impacts described for Alternative D in section 4.3.1.7.2 of the Eastern Interior Draft RMP/EIS (BLM 2012a). It is not anticipated, however, that the hardrock mineral leasing in Alternative D would trend any sensitive species toward federal listing.

3.2.6. Vegetation

A direct loss of native vegetation on 661 acres (less than one percent of the area open to mining) is estimated to occur at exploration and leasing operations during the life of the plan. Most of this vegetation would be riparian and wetland habitats. Some of this area would be needed for ongoing operations and would remain unvegetated for several to many years. A portion would be allowed to revegetate beginning within a year or two of disturbance. Times to reestablish vegetative cover would vary widely. Areas which have adequate fine and organic soil materials and viable seed and vegetative plant parts revegetate relatively quickly. Lease stipulations which require vegetation cover to meet pre-determined standards would result in faster revegetation. Riparian areas in which the stream channel was disturbed and a stable stream channel was not established would remain largely unvegetated until the channel stabilizes. Loss of fines and organic material through flooding and shifting channels can delay revegetation for decades.

The roads and trails developed for access to exploration and mine sites would disturb an undetermined area of native vegetation and supporting soils. Heavy, season-long use may result in significant loss of vegetation and degrading of soils in a variety of vegetation types. Vehicles larger than 1,000 pound curb weight and 50 inch width would be allowed in some instances, resulting in relatively greater impacts. Additional disturbance would occur through expansion of this network of roads and trails by recreational users. Much of the hardrock leasing area burned in a wildfire in 2004 and soils and vegetation may be more susceptible to impacts from motorized use.

In addition to changes in vegetation at exploration and mine sites and the network of roads and trails, establishment and spread of non-native invasive plant species could occur, facilitated by motor vehicle use.

3.2.7. Visual Resources

Effects from Hardrock Mineral Leasing

Impacts from mineral leasing would be similar to the impacts from mining operations described in section 4.3.1.9 of the Eastern Interior Draft RMP/EIS (BLM 2012a) which is incorporated by reference. Impacts from mining would vary depending on the methods used and size of

operation. Surface disturbing activities associated with mining, such as removal of vegetation and stockpiling of materials, would impact line, form, color, and texture of mined areas creating contrast between mined areas and background landforms. These activities may attract the attention of the casual observer. Large-scale placer mining would have the greatest impact to visual resources. Small-scale placer mining would have similar impacts, but at a lesser scale. Suction dredging would have the least impact, but would still impact visual resources due to camps and associated facilities.

Under Alternative D, 843,000 would be closed to hardrock mineral leasing, protecting visual resources in these areas (Figure 2.1). Closed areas include the Beaver Creek [WSR](#) Corridor, the Research Natural Areas, and approximately 86 percent of the White Mountains NRA. This would protect visual resources by not allowing surface disturbing activities associated with mineral development. The reclaimed areas along Nome Creek would be closed protecting the viewshed from the access road.

Approximately 16 percent of the NRA (160,000 acres) would be recommended open to hardrock mineral leasing. Two large-scale and 11 small-scale placer mine operations are anticipated in this area. Total disturbance from all mechanized placer mining is anticipated to be 507 acres over the life of the plan.

Approximately 11 suction dredge operations are anticipated. Each operation would have a camp with a footprint of one-half acre over the life of the mine for a total maximum disturbance from all operations of 84 acres over the life of the plan. The movement of materials from dredging occurs underwater and thus does not have a noticeable impact to visual resources and is generally redistributed each spring during break-up or high water events. Impacts from the suction dredge camps are anticipated to be less than six acres annually over the life of this plan.

Effects from Exploration Leasing and Licenses

Placer exploration activities would most likely occur within areas of medium development potential (85,000 acres). It is anticipated that four exploration licenses could be issued over the life of the plan occurring on 5,000 acres each for a total of 20,000 acres (24 percent of the medium potential area). Each operation would have a disturbed annual footprint of 2.5 acres each year for two years per license, for a total of 20 acres of disturbance.

Exploration licenses could be issued on up to 11,000 acres in the Roy Creek [REE](#) deposit; however, exploration activities would disturb only an estimated 50 acres over the life of the plan.

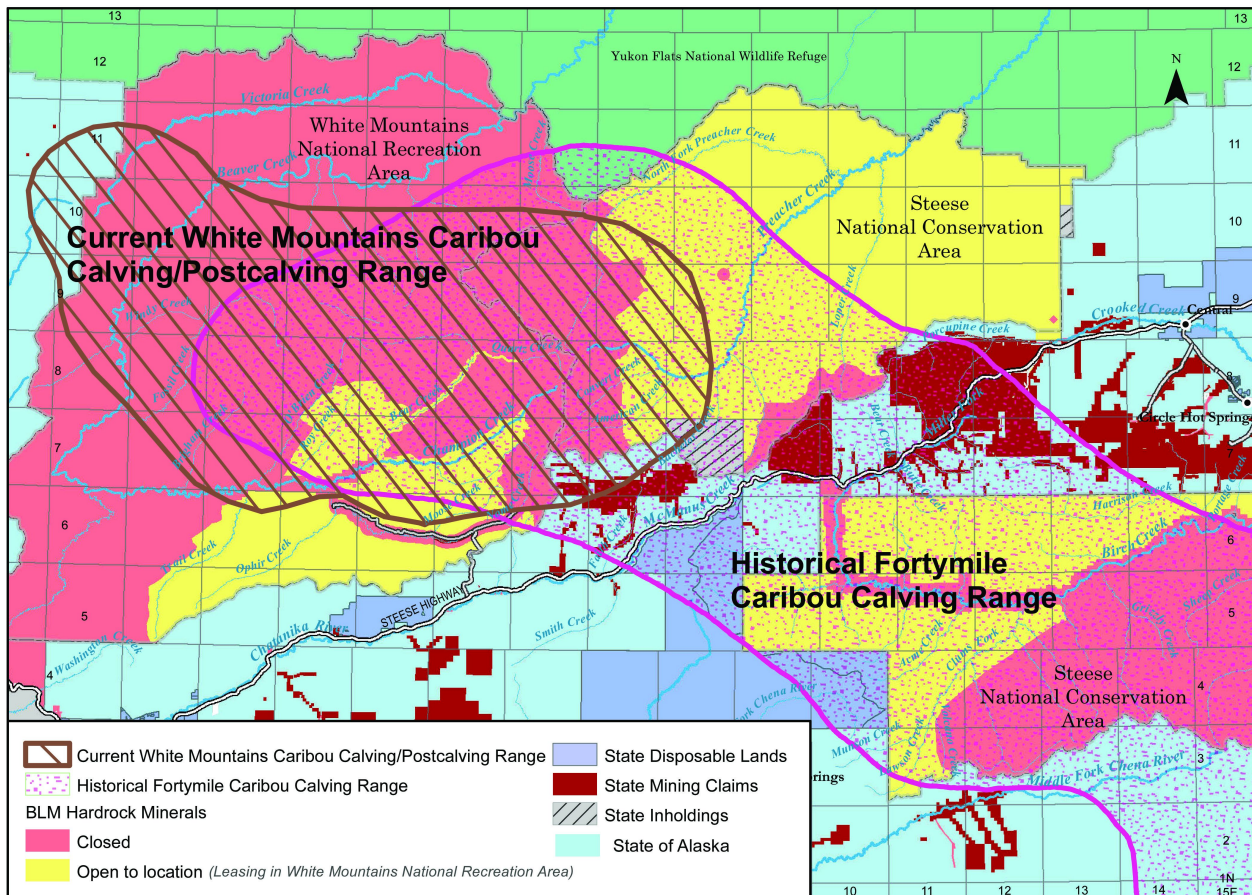
Impacts to visual resources by exploration activities would depend on the scale of the action. Changes to line, form, color and texture of the natural landscape would result from activities such as trenching, access trails, vegetation clearing for drilling activities with the removal of vegetative cover and stockpiled materials creating form contrast between the trenched areas and the stockpiled materials and the background landforms. Trenched material stockpiles would also create color contrast between the greens of vegetation and the browns of soils. Texture would change from a natural medium, subtle texture of vegetation to a coarse, rough contrast of disrupted soils and organic materials. Changes in line from the irregular, weak line of the natural landscape to a regular, strong line between natural vegetation. Drill structures would introduce straight regular lines into a natural irregular weak line of the natural landscape as well as color contrast between the greens of vegetation and the drill structure for the short time the drill was in place.

3.2.8. Wildlife

Affected Environment

The hardrock mineral leasing area contains a high diversity of wildlife habitats ranging from lower-elevation riparian habitats to alpine ridgelines. Most of the hardrock leasing area occurs within the historical calving area of the Fortymile caribou herd and within the current concentrated calving and postcalving area of the White Mountains caribou herd (Figure 3.2). The presence of prehistoric archaeological sites immediately south of Nome Creek (Mile 57 of the Steese Highway) used for hunting and caching of caribou during spring migration (Robin Mills pers. comm.) indicates that the area has long been used by large numbers of caribou during calving and migration.

The northern portions of the hardrock leasing area (including the Roy Creek [REE](#) deposit and upper Bear Creek and Quartz Creek placer gold areas) have been especially utilized by caribou. These areas occur within the core (most highly used) calving/postcalving area of the White Mountains caribou herd and the area most highly used by the Fortymile caribou herd in the past. The Fortymile herd calved in the White Mountains until 1963, and were reported to “most heavily” utilize the upper portions of Bear, Quartz, and Champion creek drainages (Olson 1957), which are mostly within the hardrock leasing area. The “concentrated calving area” identified by Olson (1957) centered on and included almost all of Bear and Champion creek drainages and headwater portions of Moose and Nome creeks. The location of Fortymile herd calving shifted from year to year, but reports indicate that the head of Bear Creek and Quartz Creek were the center of the herd’s long-term calving distribution.



This figure displays lands recommended open to hardrock mineral leasing in this Supplement or to location in Alternative D of the Draft RMP/EIS relative to areas historically used by the Fortymile caribou herd as calving habitat and the current White Mountains caribou herd calving/postcalving range. The core of the Fortymile calving range was roughly centered on the heads of Bear and Quartz Creeks from the 1900s through the 1950s before shifting southeast towards the current calving range, centered on southern Yukon-Charley Rivers National Preserve.

Figure 3.2. Map of Caribou Habitat

Dall sheep habitat occurs in and adjacent to northern portions of the hardrock mineral leasing area. A Dall sheep mineral lick occurs 0.7 mile from the mineral leasing area in upper Little Champion Creek. The Roy Creek REE deposit is utilized by Dall Sheep during the rutting season. Hobgood and Durtsche (1990) mapped the ridgeline in this area as rutting habitat. The area was not included in a recent delineation of medium-to-high Dall sheep use based on a 2004-2008 study of radio-collared Dall sheep, but that study did document short-term use by one ram during the rut, supporting the earlier designation. The scattered granite tors on the ridge between Quartz, Champion, and Bear creeks are utilized by Dall sheep in all seasons. Although not included in the area to be opened to leasing, this ridge is likely to be utilized for access to leases.

The hardrock mineral leasing area contains relatively high densities of moose, during at least the October through April time period. Rut concentrations in the area were identified by Durtsche et al. (1990). High-quality riparian and aquatic habitats, including salmon spawning and rearing and high densities of Arctic grayling, support aquatic and terrestrial wildlife species. Nutrient transfer from aquatic to upland environments increases productivity of upland habitats. One known peregrine falcon nest site occurs in the hardrock leasing area and a gyrfalcon nest site

occurs adjacent to the hardrock leasing area. Redtail hawk nest throughout the leasing area, often near streams.

Environmental Consequences

The effects on wildlife from mining (and exploration) of known deposits of hardrock minerals in the White Mountains Subunit under mineral leases would be similar to those described for locatable mineral development elsewhere in the planning area (BLM 2012a, section 4.3.1.12). Lease procedures (including Leasing Stipulations) allow the BLM to manage development of leases so as to reduce impacts to a greater extent than management under the locatable mineral laws and regulations (43 CFR 3809), but the nature and types of impacts would be similar.

Hardrock mineral leasing in Alternative D would result in an estimated direct disturbance from exploration and mining of 661 acres of terrestrial wildlife habitat. In addition, 20 miles of road is estimated to be built for access. Much of the surface disturbance from mining and access would occur to riparian areas and wetlands habitats which are typically high-value wildlife habitats. Effects of surface disturbance of these habitats would extend, to some extent, downstream into Beaver Creek WSR (e.g., through effects on turbidity or fish migration). Human activities associated with mines would reduce use of riparian habitats by many wildlife species in the immediate vicinity of the activity.

Changes in access and resulting increases in human use of the area may have a greater effect on wildlife and their habitats than direct habitat disturbance from mining-related activities. Most of the leasing area is not accessible via existing trails and much of the existing network of trails (mostly user-created) is susceptible to degradation from increased use. Mining activities would require much heavier use than the current levels of use (much of which is related to hunting) and for longer periods. Vehicles larger than allowed under [OHV](#) designations would be permitted in some cases, likely creating proportionally greater disturbance. The linear amount of new access has not been determined, but if each of the estimated 29 suction dredge and placer operations and exploration leases resulted in an average three miles of new trails (or seriously degraded existing trail), about 87 miles of such new or seriously degraded trail might be predicted.

Winter overland moves would often require clearing of vegetation. The linear clearings created may lead to summer use by OHVs and establishment of new OHV trails. The network of mining access trails would be utilized by lessees and recreationists to reach previously inaccessible areas, within which additional new trails may be created, resulting in further expansion of trail networks. Similarly, roads built for mine access would facilitate much greater [OHV](#) activity in the area in which they are constructed. In general, motorized access would increase throughout the hardrock leasing area, especially in the high potential areas. In addition to direct changes in habitat from user-created trails, the creation and use may also facilitate the establishment and spread of [NIP](#), especially in areas recently burned.

Although little Dall sheep habitat is within the identified hardrock leasing areas, human use of additional access to sheep habitats in the Upper Champion Creek and Quartz Creek area may reduce sheep use of those habitats.

Moose may benefit from some ground disturbances that result in growth of deciduous browse species, such as willow. Increased hunting pressure and harvest in previously remote areas would likely reduce harvest in areas with already-established access, such as Nome Creek. Hunting pressure may result in some displacement of moose from high-density rutting areas.

Most of the estimated 661 acres of habitat disturbance would occur within the historical calving range of the Fortymile caribou herd and current calving area of the White Mountains caribou herd (Figure 3.2). The White Mountains caribou herd has a dispersed calving distribution and the hardrock leasing area comprises a small proportion (11 percent) of the current White Mountains caribou herd calving/postcalving area. The much larger Fortymile Herd calves in a dense distribution. More than half of the hardrock leasing area of high development potential occurs within the area of concentrated calving identified by Olson (1957) for the Fortymile herd in 1956. Exploration of the Roy Creek REE deposit is estimated to result in disturbance of 50 acres of current and historic caribou calving habitat. Exploration activities would be required to occur outside of calving/postcalving season in this area, limiting impacts from those activities. The greatest impact to caribou would likely be the change in access, human infrastructure, and the generally increased levels of human activity in the area. Although anticipated placer gold mining operations in the area may have little direct effect on caribou use of the area, the combined direct and indirect effects from changes in access and human use patterns in the area would likely reduce the suitability of the area as calving habitat and potentially reduce the likelihood that the Fortymile Herd would reestablish a habit of calving season use of the White Mountains. The overall level of disturbance, including linear disturbance, and human activity within the calving area would influence the likelihood of use by caribou.

Compared with other large migratory caribou herds, the Fortymile herd's current annual range has a low proportion of range above treeline (17 percent; Boertje et al. in press). Boertje and others (in press) surmised that overgrazing of the herd's current core upland tundra habitat may have resulted in reduced herd nutrition levels and suggested that expansion to additional spring and summer upland tundra in the White Mountains may be of key importance to realizing continued herd growth.

Several species of migratory birds are dependent on (or found in much higher densities in) riparian habitats. Placer mining would remove habitat for these species in localized areas and habitat recovery may require several decades. Regardless of when the vegetation clearing occurs, impacts from the changes in vegetation would persist probably for many years. ROPs ([Appendix A](#)) protect only currently nesting birds. Nesting peregrine falcon and gyrfalcon are more likely to be affected indirectly by changes in access than directly by mining activities. Nesting redtail hawk may be displaced by nearby placer mining and dredging activities. These impacts are not expected to result in planning area population level declines of any species of migratory birds.

Cumulative Effects

Hardrock mineral leasing in Alternative D would add to the cumulative impacts from exploration and development of locatable and leasable minerals elsewhere in the planning area, including on state and private lands.

In Alternative D, with this supplement, 26 percent of the current White Mountains caribou calving/postcalving area would be open to leasing of hardrock minerals. A much higher proportion of the Fortymile herd's historical (prior to 1963) would be open to leasing (Figure 3.2). Almost the entire 38-mile segment of historical calving and migration habitat between Mount Prindle and Clum's Fork calving area would be open to location or leasing of hardrock minerals (Fig 3.4). The addition of hardrock mineral leasing would further decrease the likelihood that Fortymile caribou would reestablish a tradition of calving in the White Mountains vicinity. Given the relatively small amount of alpine habitat within the range of the Fortymile herd, re-occupation

of the calving and postcalving habitats in the White Mountains may be necessary for maintenance and growth of the Fortymile caribou population.

The development of mines and associated access in the hardrock leasing area during the life of the plan would likely make additional mines more economically feasible to develop in later years, possibly including the Roy Creek REE deposit. This could expand the intensity and zone of impacts to wildlife beyond that predicted during the life of this plan, including additional caribou and Dall sheep habitats.

3.2.9. Recreation and Travel Management

Affected Environment

Previous placer mining has affected recreation use in both positive and negative ways. Many of the trails now used in the White Mountains [NRA](#) were developed as mining access routes and formed the basis the trail development plan in the Recreation Activity Management Plan (BLM 1986). Alaska's history of mining is of interest to many recreation visitors. Mining has helped to provide some of the recreation opportunities that still exist in the NRA today and provide for a rich cultural context of the landscape and its uses.

In contrast, active mining operations and related infrastructure has the potential to have negative effects for those recreation visitors seeking a more primitive form of recreation experience, particularly in summer, when the effects of mining are more visible. The experience expectation for primitive recreation includes a feeling of solitude and closeness to nature. The 2007 and 2009 Benefits Based Management studies for the White Mountains (Fix 2007, Harrington and Fix 2009) demonstrated that in Nome Creek valley and adjacent areas of the NRA, awareness of the natural world, awareness of minimum impact recreation, and family bonding were rated as important to over 60 percent of the respondents. Highest rated activities in these areas included hiking, walking, hunting big game, berry picking and ATV riding.

The areas currently managed as a Semi-Primitive zone did have historic mining activity prior the 1980 Congressional designation. These areas were targeted for development in the Recreation Activity Management Plan (BLM 1986) to improve and sustain existing access routes and provide for a semi-primitive experience including [OHV](#) hunting opportunities, scenic qualities, recreational access to primitive areas and river put-in, wildlife viewing, and hiking opportunities. Since 1986 two campgrounds, a non-motorized hiking trail, a series of motorized summer and winter trails, recreational cabins, and river put-in have been established. These planned infrastructure developments have been entered into BLMs Facility Asset Management system and the BLM receives an annual budget for maintenance and program management.

The White Mountains NRA has quickly developed into an easily accessible recreation destination with a steady increase from 1,200 user days in 1986 to over 12,000 user days in 2011. The bulk of this visitor use increase is in the Semi-Primitive zones.

Very little historic mining occurred in areas currently managed for a primitive recreation experience. Any historic mining in the Primitive zone took place prior to the Congressional designation in 1980. Areas managed for a semi-primitive experience in the NRA have not seen mining activity for 20 years or more.

Environmental Consequences

Direct impacts to recreation include visual impacts, short-term user conflicts, and noise impacts. A formal study was conducted in 1988 for placer mining activity in Beaver Creek. The Beaver Creek Placer Mining EIS (BLM 1988b) found that negative impacts to primitive recreation experiences can result from views of the old claims and disturbance to the landscape in the adjacent recreation management zone. Impacts resultant from active mining is also caused from being able to hear the equipment or see the effects on water quality. These impacts may be mitigated with the ROPs and stipulations analyzed for each action and may be more tolerated over time by the affected user groups.

The anticipated continuous noise production for suction dredging is expected to occur up to four hours per day over a ten hour period in the same location. This continual noise could displace some recreation visitors anticipating a backcountry experience under the current recreation management classification. The [RFD](#) suggests that there would be 11 such leases. Lands immediately adjacent to the area recommended open for suction dredge leases are currently managed for primitive recreation setting. There are some large trees adjacent to the creeks in many areas that could dampen the noise levels and shield passersby from the undesirable experience.

The smell of exhaust from a continuously running engine associated with a suction dredge may impact some users by displacing them out of range of the exhaust fumes. Though similar to the exhaust fumes from an [ATV](#), the exhaust smell from a stationary operation would not pass by the recreationalist, but creates a situation where the recreationalist has to displace their intended route to avoid the smell.

Buffers around BLM-maintained facilities ([ROPs R-1 and R-2](#)) would be implemented in areas of high and medium development potential (Figure 2.1), the terrain is hilly, the trees are small or non-existent and sight distances can be miles long. Views of mining activity would be visible from ridge tops. The visual resource management ROPs would reduce visual impacts.

The Table Top Trail was designed as part of the White Mountains Gateway Project in 1987. It was designed to give non-motorized users a place to go in the midst of an area intensively managed for many uses, including various types of developed facilities including roads, OHV trails, and campgrounds. The trail crosses a ridge top with views to the ridgelines to both the north and south. Mining activity would be visible toward the north. Visual impacts may be mitigated with the ROPs.

Occupancy of mining equipment and related operations may impact as much as 0.2 acres of land for approximately 90 days per operation and impact some recreation users that would be displaced as far as necessary to be out of sight of the camp and out of audio range of the mining operation. This could potentially be miles away. Proper location of camps and staging areas could reduce this impact.

Occasional increases in turbidity levels occurred 30 to 50 miles downstream of active mining in Nome Creek (BLM 1988b, Webb 1982), a primary tributary of Beaver Creek [WSR](#). It is conceivable to assume that new mining activities in Bear, Champion, Little Champion, Ophir, and Trail Creeks could produce similar increases in turbidity especially if mining activity was occurring on more than one creek at the same time, however under the current mining regulations, turbidity levels should be greatly reduced. All of the aforementioned creeks flow into Beaver Creek. Increased turbidity or muddy water, inherent with mining activities, would reduce the aesthetic appeal of Beaver Creek and negatively influence the floating experience by boat floaters

(BLM 1983). The semi primitive recreation management zones are managed for naturalness including clear, free flowing streams with the appearance of being untouched and undisturbed by humans. Beaver Creek supports a popular grayling fishery. Fishing success would decrease in muddy water and displace some users. River hazards are more difficult to identify in muddy waters which increases floating difficulty.

Cumulative Impacts

Indirect and cumulative impacts from the activities and infrastructure associated with mining activities and exploration include the related travel and access to lease locations as well as the increase of recreational users accessing these new access routes. The geographic area of consideration for cumulative effects is the White Mountains NRA.

Access routes to leases could benefit other users if trails were constructed in the proper locations and use sustainable trail construction techniques. Cross-country travel is allowed under alternative D, however, the addition of more concentrated routes with multiple passes over the same area would compact the soil and vegetation and create a permanent scar on the landscape. User-created trails or routes created by four-wheelers are not typically sustainable because they tend to go straight up and straight down hills, which creates a path for water to accelerate and intensify erosion. User-made trails deteriorate over time. They become difficult to travel and negotiate with an [OHV](#). This can develop into a safety hazard. Roads and trails associated with mining operations are attractive to motorized recreation users. While contributing to greater access by the motoring public, it will also greatly expand the proliferation of user-made trails and multiple routes to the same location. The cumulative impact of such actions may result in increased costs for BLM administration of the recreation area and maintenance of new and unsustainable travel routes. These impacts may be mitigated during site-specific [NEPA](#) analysis when access routes for each exploration license or lease block is identified, and routed in the most appropriate location.

Mining activity is expected to occur adjacent to Backcountry and Semi-Primitive recreation management zones which are closed to the summer use of OHVs (April 15 through October 30). Mining access routes could attract more [ATV](#) users into these border areas where there is currently little to no motorized activity. Access into Bear and Quartz creeks, where suction dredge leasing would occur (and mechanized placer mining in Bear Creek), is generally on north facing slopes typical of black spruce forests and tussock tundra. These areas are underlain with permafrost near the surface and have slopes greater than 20 percent. These environmental conditions can be difficult obstacles for building trails or any kind of sustained access.

The Trail Management Objective (TMO) for managed [OHV](#) trails in the White Mountains NRA are for a type 2 semi-primitive motorized trail and describe access as “more difficult” with a tread width of 72 inches maximum and clearance width of 6 to 8 feet. The trails are not developed for access by vehicles other than ATVs and snowmobiles (generally 1,000 pounds or less curb weight and not exceeding 50 inches in width). Any mobilization of mining equipment on these trails would require the trails to be widened. A wider trail corridor could attract use of vehicles larger than allowed by current OHV regulations. Sixty-one miles of these trails are designed for winter use and are not maintained for summer use due to wet and boggy soil conditions. An increase in summer use on these little-used trails will have adverse effects on winter trails. Summer use causes rutting and erosion making winter trail maintenance difficult and reducing the quality of the trails for winter uses. Trail drainage structures currently in place would not accommodate larger vehicles.

The Quartz Creek Trail is a hardened, sustainable trail located in the area of high development potential and would be an attractive access route for mining activity. The trail is currently designed for a three-year maintenance schedule. With the anticipated increase in use, the maintenance schedule may have to be accelerated to every year. To date, there has been a significant investment of public funds into this trail, which would increase with additional maintenance needs.

According to the [RFD](#) (BLM 2012b) up to 20 miles of road could be considered for access into Bear and Quartz creeks. Up to 10 miles of road could be considered for access into Ophir Creek. Roads also attract a larger vehicle types not associated with the mining activity that are beyond the scope of the management objectives for travel management in the NRA. Larger vehicles (over 50 inches in width and greater than 1,000 pounds curb weight) would likely leave the road for cross-country travel and create some enforcement issues. Indirect effects from road construction include the reclamation of road beds after the life of the mine or the maintenance and redevelopment of sustainable road infrastructure by the BLM and would require additional expense and maintenance beyond the life of the plan.

Direct effects to recreation are expected to be short-term and could be mitigated through the ROPs or stipulations associated with [NEPA](#) analysis of each exploration or leasing action. The access needs and infrastructure associated with the mining activity will increase the proliferation of user-created trail networks in a heavily used area. The proximity to Fairbanks, growing popularity of the area, existing recreation facilities, layered with new user and travel access needs are expected to have a cumulative adverse effect on the administration of the recreation area.

3.2.10. Subsistence

Affected Environment

The affected environment is discussed in more detail in Chapter 3 of the Draft RMP/EIS (BLM 2012a) and the fish and wildlife sections of this document.

The areas recommended open to mineral leasing through this supplement are within the current White Mountains caribou herd calving and postcalving area and the historic calving and postcalving range of the Fortymile caribou herd. Caribou are most vulnerable to disturbance during these periods. The area is also important current winter range for White Mountains and Fortymile caribou. The northern portion of the area, which includes the Roy Creek [REE](#) deposit and upper Bear and Quartz creeks placer gold, are current and historic high use calving and postcalving areas for both caribou herds. Dall sheep movement corridors and habitat are within and adjacent to the area proposed for hardrock mineral leasing. The area contains relatively high densities of moose during rut and winter seasons (October through April).

Fortymile caribou are among the most important subsistence resources in the Eastern Interior Planning Area. As Yukon River salmon stocks decline, Fortymile caribou become increasingly important to subsistence users in and adjacent to the planning area. Research on land use patterns by rural residents indicates that residents of Birch Creek Village area moved seasonally into the White Mountains to harvest caribou and sheep (Caulfield 1983). Contemporary harvest data indicate little current use of White Mountains caribou and Dall sheep by rural subsistence hunters however use of these populations could increase in importance over the life of the plan and should not be discounted (Subsistence Resources, White Mountains Subunit, Draft RMP/EIS).

Environmental Consequences

Impacts on subsistence resources and uses within areas recommended open to mineral leases and exploration licenses in the White Mountain [NRA](#) include user conflicts, displacement of resources, and potential declines in resource availability due to disturbance in critical habitats (spawning) or during critical times (e.g., calving periods). Alternative D, which also allows the most latitude to [OHV](#) use and rights-of-way development and identifies the smallest area of protection for wildlife habitat, would have the highest negative impacts on subsistence of all alternatives considered.

ROPs and stipulations developed in the draft RMP/EIS and Supplement ([Appendix A](#)) to mitigate the impacts of land use actions on subsistence wildlife resources would be attached as stipulations to the authorizing documents. Minimal direct impacts to subsistence wildlife resources or uses would occur from hardrock mineral leases and exploration licenses because no exploration activities would be allowed in Dall sheep habitat from May 10 through June 1 or in caribou calving and postcalving areas from May 15 through July 15. Exceptions would be allowed when it can be demonstrated that caribou or Dall sheep do not occupy the area ([Appendix A](#), [Table A.1](#), Stipulation 5). Therefore, no direct impacts on abundance of subsistence wildlife resources is expected from this plan decision.

Indirect impacts are expected to be greater and more difficult to mitigate. Increased access to largely remote wildlife habitat is expected to occur as roads to support placer mining are developed and areas cleared of vegetation for winter overland moves become used as summer [OHV](#) pioneered trails (section 3.2.9 Recreation and Travel Management, of this document). The resulting increase in non-mining activities may reduce the suitability of the areas for calving and postcalving. Analysis of data on Fortymile caribou habitat condition indicates that current calving and postcalving range has been diminished from overgrazing and limited suitable habitat is available. The research indicates that this area of the White Mountains NRA will become increasingly important to continued growth and stability of the Fortymile caribou herd (Boertje et al. in press). Analysis of indirect impacts to Fortymile caribou from mineral leasing resulted in a finding of may significantly restrict subsistence use of Fortymile caribou (See the ANILCA Section 810 Analysis in [Appendix B](#) of this document for further analysis and findings.)

Some conflicts between hardrock-leasing related activity and federal qualified subsistence users may occur from mid-August through September and from November through March if exploration and placer mining is active during these time periods. Access by subsistence hunters may be restricted due to perceived or real barriers to wildlife resources. As a result, hunters may be displaced to other areas. When caribou are in the area during seasons open to hunting they are generally distributed over a wider area, thereby minimizing access issues for subsistence hunting. Moose are available through the greater area and much of the rural resident harvest of moose occurs away from the area open to hardrock mineral leasing, although distribution of moose hunters could change due to increased access into the area. Conflicts among hunters are not expected to be significant.

Ophir Creek, a tributary of Beaver Creek, has been identified as an area with high development potential for placer gold in Alternative D. Spawning areas for Chinook salmon have been identified within Ophir Creek. Because active mining is likely to occur in and adjacent to these spawning areas, direct impacts on this population are expected.

Indirect impacts to subsistence fish species and local water quality from mineral leasing may occur downstream due to turbidity, crossing of streams, high water events and occasional failure of settling ponds (sections 3.2.4 [Soil and Water Resources](#) and 3.2.2 [Fish and Aquatic Species](#) of

this document). These impacts are likely to be short-term. Regulations and ROPs that require recycling of turbid water through settling ponds and reclamation of disturbed stream channels should mitigate most of these impacts.

Cumulative Effects

Cumulative effects may significantly restrict subsistence use of Fortymile caribou due to past, present and reasonably foreseeable actions within the herd's range. The impacts are the same as those described for Alternative D when considered with the cumulative case for the Fortymile and Steese Subunits (BLM 2012a Appendix J).

For subsistence fisheries resources, when analyzed with the cumulative case, impacts may incrementally contribute to the downward trend and resiliency of Yukon River Chinook salmon stocks. Chinook salmon are highly important subsistence species within the Yukon River drainage. The Alaska Board of Fish (Board) classified the Yukon River Chinook salmon stock as a *stock of yield concern* in 2000 (Howard et. al., 2009). Each regulatory cycle the Board reassesses the stocks and Yukon River Chinook salmon have remained a stock of concern as it continues to decline with lower returns each year and harvestable yields not being maintained. Genetic diversity of these small stocks, such as the Ophir Creek population, are extremely important for resiliency of the Yukon drainage stocks and are often overlooked in impact analysis (JTC 2012). Due to declines of the Yukon River Chinook salmon stock and the importance of Chinook salmon to Upper Yukon subsistence villages, analysis of Alternative D with the cumulative case has resulted in a finding of may significantly restrict subsistence use of Chinook salmon within the Upper Yukon River including and downstream from the village of Beaver.

3.2.11. Social and Economic

Economic Effects

An economic effect in the White Mountains Subunit continues to result from recreation oriented activities as a result of population growth in the region. Economic effects due to mining on non-federal land and on existing federal claims outside of the White Mountains NRA, but within the subunit, would also continue to be important to the region. There are federal, state, and patented mining claims in the Livengood area with ongoing mineral exploration. Exploration and leasing for placer gold and rare earth mineral exploration would result in positive economic effects from this subunit under Alternative D.

The following discussion is based on gold mining activities likely to occur on land leased for placer or suction dredge mining (Stebbins 2009). Section 4.4.4.1.2 Fortymile Subunit, Effects from Locatable Minerals of the Draft RMP/EIS (BLM 2012a) outlines the Stebbins models for small- and large-scale placer mines, life of mines, and a background discussion of the types of economic impacts and is incorporated by reference.

Economists consider three categories of employment and income in considering the effect of an activity such as mining. These three categories are: direct employment and income, including only employees of mining companies; Indirect employment and income such as employees of businesses providing goods and services to mining companies; and, induced employment and income occurring when jobs are created as a result of spending of direct and indirect income attributable to mining activity. All employment and income shown in this analysis is estimated

using input and assumptions from BLM reports (Stebbins 2009, BLM 2009) and McDowell reports (2006 and 2009).

Opening the identified lands in the White Mountains [NRA](#) to hardrock mineral leasing under Alternative D is predicted to result in large and small-scale placer mining operations. Small-scale placer mining uses a bulldozer, and excavator and a mobile wash plant to excavate and process gold-bearing gravel. In this model, a two-man crew works 12 hours per day, seven days per week, during a 130-day season. The camp includes one support person and a cook; a total of four workers. Eleven small-scale placer mines are forecast to operate with employment of about four workers each.

Large-scale placer operations utilize excavation equipment larger than the small-scale model. In this model, 2 two-man crews moving material each work a 10-hour shift, seven days per week, during a 130-day season. Five additional employees, including a supervisor, skilled workers, and laborers; a total of nine workers are included in the model. Assuming two large-scale placer mines, the resulting employment is about eighteen workers.

Suction dredging would occur on about 11 new leases. These would employ approximately two workers per operation, for all phases.

In addition, the BLM development scenario indicates approximately four licensed placer exploration efforts. These are included in direct income calculations show in Table 3.3.

The total mining employment on BLM-managed lands would be estimated at 84 part-year workers. Data prepared by the State of Alaska uses full-time equivalents. The full-time equivalent in the White Mountain Subunit would be approximately 33 workers, based on the Stebbins (2009) models. Total employment by the Alaska minerals industry in 2008 was 3,392 full-time equivalent jobs (Szumigala et al., 2009). The statistics indicate less than one percent of the industry employment on BLM-managed lands would occur at White Mountain operations. The [DGGs](#) reported the average monthly wage for mining in Alaska during 2010 at \$8,345. White Mountains gold mining operations account for approximately \$3 million in wages, annualized. Jobs data indicates maximum level of effect predicted to occur during the life of the plan. Development scenarios used as the basis for analysis do not contain time lines for development. Mineral exploration licenses or leases may not be issued for years after the plan is completed.

Table 3.3. Direct Employment and Income for New Mining

Activity	Crew	Alternative A		Alternative B ^a			Alternative C			Alternative D		
		Current Operations	Current Jobs	New Operations	New Jobs	New Income	New Operations	New Jobs	New Income	New Operations	New Jobs	New Income
Fortymile Subunit												
Suction Dredge	2	6	12	4	8	\$278,122	8	16	\$566,244	12	24	\$834,366
Small Placer	4	27	108	4	16	\$578,142	6	24	\$867,212	13	52	\$1,878,960
Large Placer	9	2	18	1	9	\$325,204	1	9	\$325,204	1	9	\$325,204
Total		35	138	9	33	\$1,181,468	15	49	\$1,748,660	26	85	\$3,038,530
Steese Subunit												
Suction Dredge	2	1	2	0	0	\$0	8	16	\$556,224	11	22	\$764,836
Small Placer	4	7	28	1	4	\$144,535	8	32	\$1,156,283	17	68	\$2,457,102
Large Placer	9	2	18	0	0	\$0	2	18	\$650,409	2	18	\$650,409
Total		10	48	1	4	\$144,535	18	66	\$2,362,916	30	108	\$3,872,347
Upper Black River Subunit												
Suction Dredge	2	0	0	0	0	\$0	0	0	\$0	0	0	\$0
Small Placer	2	0	0	0	0	\$0	0	0	\$0	0	0	\$0
Large Placer	9	0	0	0	0	\$0	0	0	\$0	0	0	\$0
Total		0	0	0	0	\$0	0	0	\$0	0	0	\$0
White Mountains Subunit												
Suction Dredge	2	0	0	0	0	\$0	0	0	\$0	11	22	\$764,836
Small Placer	4	3	12	0	0	\$0	0	0	\$0	11	44	\$1,589,889
Large Placer	9	1	9	0	0	\$0	0	0	\$0	2	18	\$650,409
Total		4	21	0	0	\$0	0	0	\$0	24	84	\$3,005,134

^aSources: Szumigala 2011, BLM 2009, BLM 2012a, Stebbins 2009, McDowell 2006

The BLM plans to open 11,000 acres of known deposits at the headwaters of Roy Creek to mineral leasing and predicts that it will eventually issue competitive leases for deposits of certain rare earth elements under 43 CFR part 3500 on these lands. The lease is offered competitively and a royalty may result. The BLM will charge fair and reasonable rental, determined at the time of licensing or leasing. These rentals are exclusive of royalties.

Exploration activities could include mapping and drilling or trenching in the lease area over a five year period. Income effects would depend upon the size of the initial operation, which may begin with as few as three personnel plus a helicopter crew, all based off site. It is fair to assume the minimum cost of exploration over a 120 day period would average approximately \$2,000 to \$2,500 per day. This is \$240,000 to \$300,000 per season in overall cost. The cost is essentially field personnel, helicopter contract, and fuel. Part of this cost would be attributed to the Fairbanks economy. Beyond the initial exploration, expansion of activities may occur, including further drilling and delineation, and eventual mining operation. Additional NEPA analysis will be necessary on a case-by-case basis for the BLM decision to lease for production.

There are no special recreation permits in the area of likely mineral development. No impacts to commercial recreation permits are anticipated (section 3.2.9). The likely economic effect in an area of little or no commercial recreational activity is zero.

Section 3.2.10 Subsistence reports: "Contemporary harvest data indicate little current use of White Mountains caribou and Dall sheep by rural subsistence hunters however use of these populations could increase in importance over the life of the plan and should not be discounted (Subsistence Resources, White Mountains Subunit, Draft RMP/EIS)." Given that there is little or no documented subsistence use in the White Mountains NRA, an economic effect is unlikely.

Environmental Justice

Communities most likely to be affected by increased activity in the White Mountains Subunit are (Fairbanks and Livengood) do not qualify as environmental justice populations. Minority or low income populations in the Fairbanks area may benefit from employment in the recreation and mining industries. Under Alternative D, the number of special recreation permits in the planning area would be slightly higher than other alternatives. New mining leases and mineral exploration could result in additional employment accruing to local populations. Minority and low income populations would not be disproportionately impacted.

Possible negative impacts to environmental justice populations and the entire population of the area include loss of employment in another existing industry due to mining development. However, there are no commercial activities in the area potentially opened to mining under Alternative D providing employment that will be affected. All populations may benefit from expanded recreation industry employment as well as mining employment within the White Mountains Subunit. This includes additional land outside of the White Mountains NRA.

Loss of subsistence resources or opportunity may be considered. However, the extent of subsistence use of the specific areas likely to be affected must be demonstrated before there is an attributable and measurable impact. Current data indicate little subsistence activity in these areas. The Fairbanks North Star Borough is also classified as a non-rural community as such, residents of the borough do not qualify to fish or hunt under federal subsistence regulations.

Appendix A. Required Operating Procedures and Hardrock Mineral Leasing Stipulations

A.1. Introduction

The BLM has developed measures to protect resources called “Required Operating Procedures” (ROPs) and “Hardrock Mineral Leasing Stipulations” (Leasing Stipulations) as part of the development of the Draft RMP/EIS and Supplement. These measures were guided by the standards and guidelines included in the Alaska Statewide Land Health Standards (Instruction Memorandum AK 2004-023) and by the goals outlined in the RMP/EIS. The ROPs are requirements, procedures, management practices, or design features that the BLM will adopt to protect resources. Leasing Stipulations are requirements to reduce impacts to natural resources from hardrock mineral exploration and development. The ROPs and Leasing Stipulations generally do not restate requirements that already exist in regulations or laws. Regulations or laws may require conditions that are more stringent than those presented in this section.

During development of the Supplement to the Draft RMP/EIS two of the existing ROPs were modified and some new ROPs were added. **These changes are highlighted.** This appendix does not include the Fluid Mineral Leasing Stipulations. These can be found in Appendix A of the Draft RMP/EIS (BLM 2012a).

A.1.1. Required Operating Procedures

Required Operating Procedures apply to all actions, whether implemented by the BLM or authorized by the BLM and implemented by another individual, organization or agency on public land. These were based on the best information available during development of the RMP/EIS.

ROPs are common to all action alternatives and will be applied as appropriate for BLM actions and BLM-authorized activities including: leases and permits; Special Recreation Permits; oil and gas activities; hardrock mineral leasing activities; coal activities; renewable energy activities; mining Plans of Operation; and, authorizations for rights-of-way. For mineral leasing activities, ROPs would apply in addition to the Leasing Stipulations. Only those ROPs concerning resources that are potentially affected by the action will be applied to permits and authorizations. The ROPs may be modified through site-specific analysis of subsequent authorizations. Modifications to ROPs may be appropriate if other measures are taken to protect resources that would result in the same or reduced impact.

The Authorized Officer (AO) or their representative is responsible for ensuring that the intent of the ROPs presented in this RMP/EIS are followed and that permittees comply with the conditions of their authorization. Non-compliance will be documented and a notice will be sent to the permittee, along with corrective actions and a time frame in which the actions are to be completed.

A.1.2. Hardrock Mineral Leasing Stipulations

Hardrock Mineral Leasing Stipulations (Leasing Stipulations) are specific to hardrock mineral leasing and exploration in the White Mountains NRA. These Leasing Stipulations are included in a lease. In this Supplement, leasable hardrock minerals include placer gold and rare earth elements. Leasing Stipulations constitute significant restrictions on the conduct of operations under a lease.

Additional site-specific Leasing Stipulations may be added, if determined necessary, through further analysis. Steps during the leasing process where additional NEPA analysis would occur include approval of exploration licenses and associated exploration plans, lease sales, and approval of development plans for approved leases. Additional stipulations may be developed at any of these steps in the process.

Leasing Stipulations may be excepted, modified or waived by the Authorized Officer (AO) pursuant to 43 CFR 3101.1-4 and WO-IM-2008-032. The environmental analysis prepared for hardrock mineral development (such as lease sales or development plans) will address proposals to except, modify, or waive a Leasing Stipulation. To except, modify, or waive a stipulation, the environmental analysis would need to show that: 1) the circumstances or relative resource values in the area had changed following issuance of the lease; or 2) less restrictive requirements could be developed to protect the resource of concern; or 3) operations could be conducted without causing unacceptable impacts; or 4) the resource value of concern does not occur within the lease area. An exception exempts the holder of a lease from the Leasing Stipulation on a one-time basis. A modification changes the language or provisions of a Leasing Stipulation, either temporarily or for the term of the lease. A waiver permanently exempts the Leasing Stipulation.

Compliance with Leasing Stipulations is monitored by the [AO](#) or their representative. Non-compliance may result in monetary fines or operation shut-down.

A.2. Required Operating Procedures

A.2.1. Cultural and Paleontology

ROP C-1 For permitted activities, cultural resource protection and conservation will be consistent with 1) Sections 106, 110, and 101d of the National Historic Preservation Act (1966, as amended); 2) procedures under BLM's 1997 National Programmatic Agreement for Section 106 compliance or its successor agreement; and, 3) the 1998 Protocol for Managing Cultural Resources in Alaska between BLM-Alaska and the Alaska State Historic Preservation Officer (SHPO) or its successor agreement.

ROP C-2 Mitigation measures will be considered for all actions that may potentially affect cultural resources. If the AO determines mitigation measures are necessary to protect and conserve known cultural resources, a mitigation plan will be approved by SHPO and implemented by the [AO](#). Mitigation plans will be reviewed as part of Section 106 consultation for National Register of Historic Places eligible or listed properties. The extent and nature of recommended mitigation will be commensurate with the significance of the cultural resource involved and the anticipated extent of the damage. Costs for mitigation will be borne by the land use applicant.

ROP C-3 The BLM will evaluate the impacts of proposed actions to known paleontological resources. If damage to known significant paleontological resources cannot be avoided, the

applicant (or the BLM for internal actions) will perform scientific examination of the impacted significant paleontological resources followed by mitigation approved by the [AO](#). This may include the professional collection and analysis of significant specimens by scientists.

A.2.2. Fish and Aquatic Species

ROP FA-1 No road crossings will be permitted in priority fish species spawning habitat, unless no feasible alternative exists.

ROP FA-2 New, replacement, and reconstructed stream crossing structures (such as bridges and culverts) will be designed to:

- Accommodate a 100-year flood event, including bedload and debris;
- Maintain fish and aquatic organism passage;
- Maintain channel integrity;
- Accommodate mean bankfull channel widths; and,
- Incorporate adjacent reclamation (such as willow cuttings, wattles, brush layering) on the disturbed areas up and downstream of the abutments.

ROP FA-3 Application of pesticides and other toxicants will occur in a manner that does not prevent or retard attainment of desired conditions or adversely impacts priority aquatic species.

ROP FA-4 Drilling is prohibited in fish-bearing rivers and streams, as determined by the active floodplain; and fish-bearing lakes, except where the applicant can demonstrate on a site-specific basis that impacts would be minimal or it is determined by the [AO](#) that there is no feasible or prudent alternative.

ROP FA-5 When feasible, all water intakes will be screened and designed to prevent fish intake.

ROP FA-6 Reclamation plans for the rehabilitation of fish habitat as required under 43 CFR 3809.420(b)(3)(ii)(E) (Performance standards in part 3809 will also be used for hardrock mineral leasing operations in the White Mountains NRA) will focus on three objectives. Typically, these requirements would be satisfied through the development of a site-specific reclamation plan and on achievement of reclamation objectives. Bond release would be based on meeting specific measurable objectives outlined in a monitoring plan (43 CFR 3809.401(b)(3)). These objectives are:

1. Provide a stable channel form that is in balance with the surrounding landform such that channel features are maintained and the stream neither aggrades nor degrades. To achieve this, it will be necessary to design a post-mining stream channel using morphological characteristics of the pre-disturbance channel and floodplain (such as bankfull and floodprone dimensions, meander patterns, design flows and velocities, riffle-to-pool ratios, substrate particle sizes, and so on); which could be derived from field surveys of the area, remotely sensed information, and/or information from adjacent watersheds that exhibit similar characteristics as the watershed proposed for mining.
2. Provide sufficient riparian vegetation or anchored rocks/logs to effectively dissipate stream energy, prevent soil erosion, stabilize streambanks, provide essential nutrient input, and maintain water quality and floodplain function.
3. Provide instream habitat complexity similar to that of pre-disturbance levels through the use of instream structures (such as vortex rock weirs, cross-vane structures, and installation of root wads).

ROP FA-7

Within Riparian Conservation Areas, the Salmon Fork ACEC, and areas open to hardrock mineral leasing in the White Mountains baseline hydrological data adequate to characterize the seasonal flow patterns and discharge will be required prior to surface-disturbing activities with the potential to affect stream channel integrity; reduce riparian functioning condition; or, reduce the Watershed Condition Rating. The BLM will be available to advise operators on the exact type of information and detail needed to meet this requirement. Reclamation plans will be designed to result in rehabilitation of habitats within an accelerated timeframe (such as less than three years) and will focus on active revegetation and streambank stabilization techniques as the basis for reclamation design.

A.2.3. Forestry

ROP Forest-1 Timber sale authorizations will require the proper site preparation to ensure natural regeneration of timber stands.

ROP Forest-2 Timber sales will include buffers to prevent disturbance of priority fish species habitat and sedimentation into streams. Buffer widths will be dependent on harvest method, season of harvest, equipment used, slope, vegetation, and soil type. Winter operations will be considered in order to avoid the need for road building and reduce impacts to soils, vegetation, and riparian areas.

A.2.4. Hazmat and Waste Management

ROP Hazmat-1 Areas of activities will be left clean of all debris to minimize environmental contamination from solid waste.

ROP Hazmat-2 All solid wastes, including incinerated ash, will be removed by the permittee from public lands and disposed of within an Alaska Department of Environmental Conservation (ADEC) approved facility, unless otherwise specified. Solid waste combustibles may be incinerated in a contained and controlled manner, however, burn restrictions may apply during high-risk wildland fire seasons. Burial of solid waste is not authorized on public lands.

ROP Hazmat-3 Wastewater should be managed in accordance with Title 18 Alaska Administrative Code, Chapter 72, (18 [AAC](#) 72) Wastewater disposal. Wastewater can be defined as human wastes (sewage) and gray water (wastewater from a laundry, kitchen, sink, shower, bath or other domestic sources). Pit privies are authorized in accordance with 18 AAC 72.020(b)(c)(i), 72.030 and all applicable updates. If these standards cannot be met, then special authorization may be given by the [AO](#). Gray water may not be released in any waterbody, without authorization under the Alaska Pollutant Discharge Elimination System (APDES). Gray water may be filtered and released to the surface so as not to cause erosion, and the grey water released must maintain compliance with the ADEC's guidance.

ROP Hazmat-4 All hazardous materials and petroleum, oil, and lubricants (POLs) will be stored in containers that are compatible to the material being stored. Containers will be labeled with the responsible party's name, contents of the container, the date the product was purchased, and the date the container was filled.

ROP Hazmat-5 Transportation and storage of POLs will be handled in a safe manner to avoid impacts to the environment and human health. The storage area for any POLs must be approved by the AO.

ROP Hazmat-6 POLs that are transferred to remote locations for operations are to be stored within a containment area constructed to contain 110 percent of the volume of the largest container. The containment area must be lined with an impermeable liner which is free of cracks or gaps, compatible with the contents to be stored, and sufficiently impervious to contain leaks or spills. The containers shall be covered to eliminate the collection of rainwater within the containment area throughout the storage period.

ROP Hazmat-7 All hazardous materials/toxic substances must be disposed of in accordance with EPA and [ADEC](#) regulations at the time of disposal.

ROP Hazmat-8 Transfer of POLs to equipment will be completed in a secure manner to minimize the possibility of contamination to the surrounding environment. At a minimum, POL-type absorbent pads will be placed under the transfer location to catch overflow or assist the operator in containing a spill. If refueling cannot be avoided within riparian habitat, 500 feet of fish-bearing waterbodies, or 100 feet of non-fish bearing waterbodies; the responsible party must exercise caution while refueling to ensure no release of POLs into the waterbody. Equipment that has been identified as having a fluid leak must have a drip basin placed under the leak area to ensure no release to the surrounding environment or collection of rain water.

ROP Hazmat-9 Equipment maintenance by the responsible party may be allowed if it is necessary to operate equipment as described in the authorization. Equipment maintenance that has the potential to release fluids should be completed over an impermeable liner to ensure fluid migration to the environment does not occur.

ROP Hazmat-10 A Spill Prevention, Control and Countermeasure Plan will be written for all sites which have the potential to store 1,320 gallons or more of POLs. Spill Prevention, Control and Countermeasure Plans will follow the requirements in 40 [CFR](#) 112 and state regulations.

ROP Hazmat-11 All spills will be contained and cleaned up in accordance with [ADEC](#) guidance as soon as the release has been identified, unless health and safety of personnel is at risk. ADEC discharge notifications and reporting requirements are outlined in AS 46.03.755 and 18 AAC 75 Article 3. The release of POLs to any waterbody must be immediately reported to ADEC, as soon as the person has knowledge of the release. The responsible party will contact the [AO](#) within 48 hours of a spill on public lands. Notifying the EPA may be required for discharges of oil, as required by 40 CFR 112.4.

A.2.5. Mineral Materials

ROP MM-1 Use existing upland material sources that meet suitability and economic needs whenever possible. Using material from wetlands, lakes, and active or inactive floodplains will be avoided, unless no feasible upland alternative exists. Sales or permits for in-stream gravel extraction within an active channel will not be allowed in priority fish species spawning habitat.

ROP MM-2 When authorizing mineral material sale sites, avoid habitats critical to local fish or wildlife populations (such as fish spawning and overwintering, calving areas, or raptor nesting sites). Avoid key geomorphic features, such as the river cut banks and associated riparian zones; springs; active channels of small, single channel rivers; and, wetlands.

ROP MM-3 When authorizing mineral material sale sites, avoid priority plant species and communities. If sales are authorized in vegetated areas all overburden, vegetation mats and debris will be saved and appropriately stored for use during site reclamation to facilitate vegetative recovery.

ROP MM-4 When scraping gravel in active or inactive floodplains, maintain buffers that will constrain active channels to their original locations and configurations.

A.2.6. Soils

ROP Soils-1 Save all organic material in a separate area from overburden (defined in 43 CFR 23.3 (d)) for future use.

ROP Soils-2 Stockpiled soil and overburden will be spread over mine tailings and stabilized to minimize erosion. The shape of contoured tailing and overburden should approximate the shape of surrounding terrain.

ROP Soils-3 Roadways will be ditched on the uphill side. Culverts or low water crossings will be installed at suitable intervals. Spacing of drainage devices and water bars will be appropriate for the road gradient and soil erodibility of the site.

ROP Soils-4 Design roads and trails for minimal disruption of natural drainage patterns.

ROP Soils-5 Roads and trails should avoid areas with unstable or fragile soils.

ROP Soils-6 Water bars will be placed across reclaimed roads. Spacing will be dependent on road gradient, soil erodibility, and other site-specific factors.

ROP Soils-7 Snow and ice bridges will be removed, breached, or slotted before spring break-up. Ramps and bridges will be substantially free of soil and debris.

ROP Soils-8 Overland moves and heavy equipment use:

- Whenever possible, overland moves that are a part of permitted operations will occur during winter when frost and snow cover is sufficient to minimize vegetation and soil disturbance and compaction. The AO will determine the date when sufficient frost and snow cover exists and no overland moves should occur until these conditions are met.
- Design and locate winter trails and ice roads for overland moves to minimize compaction of soils and breakage, abrasion, compaction, or displacement of vegetation.
- Clearing of drifted snow is generally allowed, to the extent that vegetative ground cover is not disturbed.
- Offsets of winter trail/ice road locations may be required to avoid using the same route or track each subsequent year.
- When access is required in snow-free months, routes that utilize naturally hardened sites will be selected to avoid trail braiding and wetlands will be avoided. The permittee will employ vehicle types and methods that minimize vegetation and soil disturbance, such as use of air or water craft, utilizing existing roads or trails, or use of low ground pressure vehicles.
- The use of heavy machinery in saturated soil conditions will be limited to low ground pressure designated machinery.

A.2.7. Recreation

ROP R-1 No mining activity within one-half mile of Crowberry and Richards cabins.

ROP R-2 No mining activity within 200 feet of BLM-managed recreational trails.

ROP R-3 No utilization of public use cabins for purposes of mining activity.

A.2.8. Special Status Species

ROP SS-1 The planning area may contain or be identified with Special Status Species or their habitats. The BLM may require actions to avoid or minimize impacts to Special Status Species, pursuant to BLM policy and Endangered Species Act consultation.

ROP SS-2 Where practical, use may be redirected to protect Special Status Species habitat; to enhance indigenous animal population; or, to otherwise maintain public land health through avoidance of sensitive habitat. If impacts to Special Status Species (populations and habitats) cannot be avoided, the applicant (or the BLM for internal actions) will develop mitigation measures to reduce impacts.

ROP SS-3 Where populations or individual sensitive status plant species are located, take measures to protect these populations or individuals through site-specific buffers or management prescriptions. Route new roads and trails away from known sensitive plant communities, with minimum 100-foot buffers; and minimize summer cross-country OHV travel where there are sensitive plants.

A.2.9. Subsistence

ROP Sub-1 For externally generated actions, the BLM may require applicants to provide information to potentially affected subsistence communities regarding the timing, siting, and scope of a proposed activity; and to consult with the potentially affected subsistence communities about ways to minimize impacts to subsistence. If these consultations occur, the applicant may be required to provide documentation of their consultation efforts to the BLM.

A.2.10. Vegetation and Non-Native Invasive Species

ROP Veg-1 All vegetation treatments and revegetation of surface disturbance will require an approved site-specific plan designed to prevent the introduction of non-native invasive plants (NIP), and achieve desired conditions. These plans should describe current vegetative conditions: including plant community composition, structure, cover, seral stages, soil descriptions, age class distribution if applicable, and presence of NIP, desired vegetative conditions (based on the ecological capability of the site), treatment methods, measures for preventing introduction and spread of NIP, and monitoring actions. Whenever possible, treatments will use native vegetation and seed. Non-native vegetation and seed may be used with specific approval from the [AO](#), and in the following cases (1) where native species are not available in sufficient quantities; (2) where native species are incapable of maintaining or achieving the objectives; or, (3) where non-native species are essential to the functional integrity of the site. Seed must meet Alaska certification standards (11 [AAC](#) 34.020 Prohibited and Restricted Noxious Weeds) and any amendments to the existing seed laws or new seed legislation.

ROP Veg-2 Existing roads and trails will be utilized for access where feasible, rather than creating new roads and trails. All road or trail construction must include a plan for reclamation similar to a vegetation treatment plan in ROP Veg-1 above. It should also include best management practices for revegetation of cuts and fills and minimize off-site sediment transport impacts. Construction of road or trails in wetlands and floodplains will be avoided.

ROP Veg-3 Destruction of the vegetative mat and associated vegetation will not be authorized, unless the [AO](#) determines that no feasible alternative exists. In those cases the AO will require that the vegetative mat and topsoils be salvaged and appropriately stored and used for reclamation. If the AO decides that vegetative mat and topsoils cannot be salvaged, other measures to protect vegetation and soils will be considered. Plans for revegetation of surface disturbances will be clearly addressed during authorization of an action.

ROP Veg-4 Design and locate permanent facilities to minimize the development footprint.

ROP NIS-1 To eliminate, minimize, or limit the spread of noxious and non-native invasive plants, only feed and mulch (hay cubes, hay pellets, or straw, for example) certified as weed-free through the Alaska Weed-Free Forage certification program (or other programs with approval of the AO) will be authorized on BLM lands. Where Alaska certified sources are not available, locally produced forage and mulch may be used with approval from the AO. If no certified weed-free or local sources are available, other products may be used with the approval of the AO.

ROP NIS-2 To eliminate, minimize, or limit the spread of noxious and non-native invasive plants, only gravel and material certified as weed-free through the Alaska Weed-Free Gravel certification program will be authorized on BLM lands. Where weed-free gravel and materials are not available other sources may be used, with the approval of the AO.

ROP NIS-3 Fire management actions, including prescribed fire operations, wildland fire suppression and fire rehabilitation efforts, will protect burned and adjacent areas from the introduction and spread of non-native invasive plants. Protection may include the use of washing stations with a containment system.

ROP NIS-4 Employ measures outlined in the most current Alaska Aquatic Nuisance Species Management Plan (ADF&G 2002a) and the most current Interim Fire Operations Guidance to Prevent Spread of Aquatic Invasive Species (USFS 2011) to reduce the introduction and spread of Aquatic Nuisance Species.

ROP NIS-5 All actions implemented or authorized by the BLM will include measures to prevent the introduction and spread of non-native invasive species, if applicable to the site.

A.2.11. Visual Resource Management

ROP VRM-1 To the extent practicable, all facilities and activities will be located away from roads (except access roads), rivers, trails, and other transportation features; using distance to reduce the facility's visual impact along travel corridors.

ROP VRM-2 All facilities and activities will be designed to meet the visual resource management class, using proper siting and location so that natural features of vegetation and landforms provide screening from travel corridors and other key observation points, and to blend with the natural surroundings.

ROP VRM-3 The modification or disturbance of landforms and vegetative cover will be minimized. Facilities and activities will be designed to reduce unnecessary disturbance.

ROP VRM-4 Facilities and activities will be designed so their shapes, sizes, colors, and textures harmonize with the scale and character by repeating the elements of line, form, color and texture of the surrounding landscape, where possible.

ROP VRM-5 In open exposed landscapes, development will be located in the opposite direction from the primary scenic views, where feasible.

A.2.12. Water, Riparian, and Wetlands

ROP Water-1 Where instream operations are authorized, streams must be diverted using an appropriately sized bypass channel.

ROP Water-2 In mining operations and fluid mineral leasing operations, all process water and ground water seeping into an operating area must be treated appropriately (i.e., use of settling ponds) prior to re-entering the natural water system.

ROP Water-3 Settling ponds will be cleaned out and maintained at appropriate intervals to comply with state and federal water quality standards. Fine sediment captured in the settling ponds will be protected from washout and left in a stable condition at the end of each field season to prevent unnecessary or undue degradation to the environment during periods of non-operation.

ROP Water-4 Streams altered by channeling, diversion, or damming will be restored to a condition that will allow for proper functioning of the riparian zone and stream channels. Active streams will be returned to the natural water course or a new channel will be created at its lowest energy state (valley bottom) that approximates the old natural channel in shape, gradient, and meander frequency using a stable channel design.

ROP Water-5 All permitted operations will be conducted in such a manner to not block any stream or drainage system.

ROP Water-6 Structural and vegetative treatments in riparian and wetland areas will be compatible with the capability of the site, including the system's hydrologic regime, and will contribute to maintenance or restoration of proper functioning condition.

ROP Water-7 Projects requiring the withdrawal of water will be designed to maintain sufficient quantities of surface water and contributing groundwater to support fish, wildlife, and other beneficial uses.

ROP Water-8 State-designated stream crossings will be used where possible for vehicle travel. Stream crossings are online at <http://www.habitat.adfg.alaska.gov/gpvehstreamxings.php>, noted under the General Permits Index-Authorized Vehicle Stream Crossings

ROP Water-9 Rivers and streams will be crossed by vehicles at shallow riffles from point bar to point bar, where possible.

ROP Water-10 When a stream must be crossed, the crossing will be as close to possible to a ninety degree angle to the stream. Stream crossings will be made at stable sections in the stream channel, based on Rosgen channel type evaluations.

ROP Water-11 Disturbed stream banks will be recontoured and revegetated (or other protective measures will be taken) to prevent soil erosion into adjacent waters.

A.2.13. Wildland Fire Management

ROP FM-1 Permittees and casual users will be held financially responsible for any actions or activity that results in a wildland fire. Costs associated with wildland fires include (but are not limited to) damage to natural or cultural resources and costs associated with any suppression action taken on the fire.

ROP FM-2 The BLM will not be held responsible for protection of permittees' structures or their personal property from wildland fire. It is the responsibility of permittees and lessees to mitigate and minimize risk to their personal property and structures from wildland fire, following the conditions in their permit.

ROP FM-3 Gas-powered equipment must be equipped with manufacturer approved and functional spark arrestors.

ROP FM-4 To avoid the potential impacts to aquatic life, the [BLM](#) prohibits the use of fire retardant, except when necessary to protect human life, permanent year-round residences, national historic land-marks, structures listed or eligible for the National Register of Historic Places, government facilities, other designated sites or structures, or high-value resources on adjacent lands. Water will be used instead of fire retardant where possible or appropriate. The use of fire suppressant foams is prohibited. Fisheries staff will be involved with decisions to deliver chemical retardant, additives to, or grey water discharge into surface waters.

ROP FM-5 The use of tracked or off-road vehicles in wildland fire suppression or management activities will be conducted in a manner that does not cause erosion, riparian area damage, water quality or fish habitat degradation, or contributes to stream channel sedimentation.

ROP FM-6 Off-road use of heavy equipment and other motorized vehicles requires approval of the AO.

ROP FM-7 Rehabilitate burned areas in accordance with the wildland fire-specific rehabilitation plan provided by the Field Office to the suppression agency.

ROP FM-8 Firelines to mineral soil will not be built in or around riparian areas; unless they are needed to protect life, property, and/or wetland resources. Use natural features as preferred firebreaks over firelines constructed to mineral soil. When possible, use hand crews to construct firelines within (or adjacent to) riparian areas.

ROP FM-9 To the extent practicable, select the location for incident bases, camps, helibases, and so on to avoid riparian areas.

A.2.14. Wildlife

ROP Wild-1 Design pipelines and roads to allow the free movement of wildlife and the safe, unimpeded passage of the public while participating in traditional subsistence activities. The currently accepted design practices are: 1) Above-ground pipelines will be elevated a minimum of seven feet, measured from the ground to the bottom of the pipeline at vertical support members, to facilitate human and wildlife movement under the pipe; 2) In areas where facilities or terrain

may funnel caribou movement, ramps over pipelines or buried pipelines may be required; and, 3) Where feasible, maintain a minimum distance of 500 feet between above-ground pipelines and roads.

ROP Wild-2 Prior to development of large facilities, the [AO](#) may require development of an ecological land classification map of the development area. The map will integrate geomorphology, surface form, and vegetation at a scale, level of resolution, and level of positional accuracy adequate for detailed analyses of development alternatives and facility siting options. The map will be prepared in time to plan one summer season of ground-based wildlife or vegetation surveys, if deemed necessary by the AO, before approval of exact facility location and facility construction.

ROP Wild-3 Whenever possible, operations that require vegetation removal will avoid the migratory bird nesting period of May 1 to July 15 ([USFWS](#) Advisory: Recommended Time Periods for Avoiding Vegetation Clearing in Alaska to Protect Migratory Birds. September 2007). If [NEPA](#) analysis reveals that this would unacceptably compromise project objectives or logistical feasibility, potential impacts must be identified, and mitigation applied that are appropriate to the magnitude and duration of expected effects. Assessments would focus on species of concern, priority habitats, and key risk factors. Permittees/project proponents will be reminded that it is their responsibility to comply with provisions of the Migratory Bird Treaty Act.

ROP Wild-4 Employ industry accepted best management practices to prevent raptors and other birds from colliding with or being electrocuted by utility lines, alternative energy structures, towers, and poles (APLIC 2006, <http://www.aplic.org/>). If possible bury utility lines in important bird areas. Where raptors are likely to nest in human-made structures (such as cell phone towers) and such use could impede operation or maintenance of the structures or jeopardize the safety of the raptors; equip the structures with either (1) devices engineered to discourage raptors from building nests, or (2) nesting platforms that will safely accommodate raptor nests without interfering with structure performance.

ROP Wild-5 Guy-wired apparatus, regardless of purpose, will be marked in accordance with the guidance provided by the USFWS Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers, dated September 14, 2000, or a more current or contemporaneous version of that guidance.

ROP Wild-6 To minimize the potential for disease transmission to wildlife, the use of domestic sheep, goats, alpacas, llamas, and other similar species will not be authorized in conjunction with BLM authorized activities in Dall sheep habitat.

ROP Wild-7 Activities will not be authorized between May 15 and July 15 if the activity will interfere with caribou calving and postcalving activities or Dall sheep lambing (May 10 through June 1). However, ongoing mineral production activities will be allowed throughout these time periods. In these areas and time periods, aircraft associated with activities that require BLM authorization will maintain an altitude of at least 1,500 feet above ground level (except for takeoffs and landings), unless doing so would endanger human life or violate safe flying practices. These seasonal restrictions can be modified based on actual caribou or Dall sheep occupancy of the area.

ROP Wild-8 Within the Fortymile and White Mountains caribou calving and postcalving ranges (Map 90 of the Draft RMP/EIS), mineral exploration activities will not be authorized from May 15 through July 15 unless the AO determines that caribou no longer occupy the specific area

of the proposed operations. This seasonal restriction can be modified based on actual caribou occupancy of area.

ROP Wild-9 All reasonable precautions will be taken to avoid attracting wildlife to food and garbage. Garbage from all BLM authorized activities will be removed and properly disposed to prevent habituation of wildlife or alteration of populations. The BLM may require food and garbage to be stored in bear-proof containers or by methods that make it unavailable to bears or other wildlife.

ROP Wild-10 From May 1 through August 31, avoid sustained human activity within one-quarter mile of trumpeter swan nests and rearing ponds. No activity will commence prior to May 15 and, if necessary, qualified personnel will conduct a preliminary site survey within the two-week period prior to the projected start date of the activity to determine trumpeter swan presence. If present, short-term activities will be delayed until after nesting trumpeter swans and cygnets have left the habitat. Exceptions may be granted by the AO, following [NEPA](#) analysis, if no feasible alternative exists.

ROPs Specific to Areas of Critical Environmental Concern

The following four ROPs apply to the Steese, Fortymile, and White Mountains ACECs and the White Mountains Wildlife Conservation Area. They are not applicable to the Salmon Fork ACEC

ROP Wild-11¹ Applicants proposing to conduct surface-disturbing activities or other intensive activities will, at the determination of the [AO](#), be required to submit an approved plan (Caribou and Dall Sheep Impact Assessment and Mitigation Plan) describing methods to minimize impacts to caribou and Dall sheep and their habitat. This plan must describe the proposed project, the design and mitigation alternatives considered, the amount and quality of habitat to be affected, the mitigation and restoration to be applied, the residual impacts predicted, and the monitoring to be undertaken to confirm mitigation success.

ROP Wild-12¹ Permanent roads will generally not be allowed (although long-term temporary roads may be) and roads will generally not be open to the public. Roads will be of the lowest practical profile. Road use may be restricted during caribou calving, postcalving, or Dall sheep lambing. Road construction will not be permitted if other means of access is practical (such as aircraft or winter ice-road). Facilities within ACECs that require year-round access will be located in forested areas where practical. Permitted aircraft will follow a minimum flight level of 1,500 feet above ground level, except at landing and takeoff and when it would compromise safety. The [AO](#) may allow exceptions to these access requirements where impacts to caribou and Dall sheep are adequately minimized and where other resource considerations are of higher priority.

ROP Wild-13¹ To minimize habitat loss, the surface disturbance and the aerial extent of facilities will be minimized. The amount of cumulative vegetation clearing and surface disturbance will be minimized through an integrated review of planned disturbance between all land users.

ROP Wild-14¹ Reclamation and revegetation of disturbed areas will be required to meet performance standards set in site-specific reclamation plans, such as a required plant cover (percent) within a certain number of years before a performance bond is released.

¹ Applicable to the Steese, Fortymile, and White Mountains ACECs and the White Mountains Wildlife Conservation Area.

Priority Raptor ROPs

Priority raptor species are peregrine falcon, gyrfalcon, bald eagle, and golden eagle. Nesting seasons are defined as: From April 15 through August 15 for bald eagles, golden eagles, and peregrine falcons; and, from March 15 through July 20 for gyrfalcons. Nesting season dates apply to ROP Wild-16 through ROP Wild-20.

ROP Wild-15 To minimize the direct loss of priority raptor foraging habitat, all reasonable and practicable efforts will be made to locate permanent facilities as far from priority raptor nests as feasible and to minimize habitat loss to the extent feasible. Of particular concern for avoidance are ponds, lakes, streams, wetlands, and riparian habitats.

ROP Wild-16 To minimize disturbance to nesting priority raptors, aircraft authorized by the BLM are required to maintain an altitude of at least 1,500 feet above ground level when within one-half mile of priority raptor nesting sites during nesting season. This protection is not intended to restrict flights necessary to conduct wildlife surveys satisfying wildlife data collection requirements.

ROP Wild-17 To reduce disturbance to nesting priority raptors, campsites authorized by the BLM, including short- and long-term camps and agency work camps, must be located at least 500 meters from any known priority raptor nest site during the nesting season. Exceptions may be granted by the [AO](#) if no feasible alternative exists.

ROP Wild-18 Authorized human activity within 500 meters of priority raptor nest sites will be minimized during the nesting season. The cumulative number of authorized visits (defined as each day in which work is done within 500 meters of a nest site) to any nest site per nesting season, by all authorized users, must be limited to three visits per nest site. Exceptions may be granted by the AO if no other feasible alternative exists.

ROP Wild-19 To reduce disturbance impacts to priority raptors, motorized ground-vehicle use must be minimized within one mile of any known priority raptor nest during the nesting season. Such use is prohibited within one-half mile of nests during the nesting season, unless an exception is granted by the AO.

ROP Wild-20 Construction within one-half mile of known priority raptor nests is prohibited during the nesting season. No facilities that will be used or accessed during the nesting period (including the area of associated human activity by facility users) can be constructed within one-half mile of known priority raptor nesting sites. Exceptions may be granted by the [AO](#) if no feasible alternative exists.

ROP Wild-21 Post mining rehabilitation of fish and wildlife habitat will be required. Reclamation and revegetation of disturbed areas will be required to meet performance standards set in site-specific reclamation plans, such as required plant cover (percent) within a certain number of years before a performance bond is released.

A.3. Hardrock Mineral Leasing Stipulations

The following leasing stipulations would be applied to hardrock mineral lease sales.

Table A.1. Hardrock Mineral Leasing Stipulations

Stipulation	Areas where Stipulations Apply	Exception, Modification, Waiver
Goal: Prevent avoidable damage from proposed land uses to habitats supporting Special Status Species animals and plants, and their habitats.		
Stipulation 1: The lease area may contain or be identified with Special Status Species or their habitats. The BLM may require applicants to conduct inventories for Special Status Species and to avoid or minimize impacts to these species pursuant to BLM policy and Endangered Species Act consultation.	Areas open to hardrock mineral leasing	Exception: None Modification: None Waiver: None
Goal: Ensure that goals to protect other resource values in the planning area are met to the extent possible when authorizing hardrock mineral leasing activities.		
Stipulation 2: Upon abandonment or expiration of the lease, all hardrock mineral-related facilities will be removed and sites rehabilitated as near to the original condition as practicable, subject to the review of the AO .	Areas open to hardrock mineral leasing	Exception: The AO determines that it is in the best interest of the public to retain some or all facilities. Modification: None Waiver: None
Goal: Minimize impacts to wildlife species from BLM-authorized activities.		
Stipulation 5: No exploration activities from May 10 through June 1 in Dall sheep habitats and from May 15 through July 15 in caribou calving/postcalving habitat. Construction of production facilities and production activities may occur.	Identified caribou calving/postcalving and Dall sheep habitats	Exception: The AO may grant an exception if the lessee demonstrates that calving caribou or Dall sheep are not currently using the area. Modification: Season may be shortened or extended based on actual occupancy of the area. Waiver: This stipulation may be waived if caribou migratory patterns change and the areas are no longer used for calving.
Stipulation 6: No exploration or development activities within 500 meters of active priority raptor nests from April 15 through August 15 (only March 15 through July 20 for gyrfalcon nests).	Areas open to hardrock mineral leasing	Exception: The AO may grant an exception if the lessee demonstrates that impacts would be minimal or there is no feasible or prudent alternative and after consultation with the U.S. Fish and Wildlife Service. Modification: Season may be adjusted based on actual nest occupancy. Waiver: None
Stipulation 7: No motorized ground-vehicle use or facility construction within a half mile of any known priority raptor nests from April 15 through August 15 (only March 15 through July 20 for gyrfalcon nests).	Areas open to hardrock mineral leasing	Exception: The AO may grant an exception if the lessee demonstrates that impacts would be minimal or there is no feasible or prudent alternative. Modification: Season may be adjusted based on actual nest occupancy.

Stipulation	Areas where Stipulations Apply	Exception, Modification, Waiver
		Waiver: None

Appendix B. Section 810 Analysis

B.1. ANILCA Section 810 Evaluation and Finding for the Supplement to the Eastern Interior Draft RMP/EIS

This Section 810 evaluation is supplemental to Appendix J sections J.2.4.4 and J.2.4.5 of the Eastern Interior Draft RMP/EIS (BLM 2012a), which analyzed Alternative D decisions on leasing mineral materials (gravel), travel management, and wildlife habitat conservation areas in the White Mountains Subunit. This supplement analyzes the leasing of hardrock minerals within the southeast portion of the White Mountains [NRA](#). The area recommended open to leasing includes headwater tributaries of the Beaver Creek WSR. This supplemental evaluation only addresses Alternative D in the White Mountains Subunit.

B.2. White Mountains Alternative D

Alternative D emphasizes active management to facilitate resource development on BLM lands in the subunit. As part of this management direction, leasing of hardrock minerals on approximately 16 percent of the White Mountains NRA would be considered. Travel and trail restrictions would be minimized. A smaller wildlife conservation area focused on protection of Dall sheep and caribou habitat would be identified.

Evaluation of the Effects of Use, Occupancy, or Disposition

Development of mechanized placer mines and suction dredging placer operations would be allowed in areas with high development potential under mineral leases. The projected disturbance as determined through the reasonably foreseeable development (RFD) scenario would be about 591 acres over the life of the plan. Known deposits of rare veeearth elements in the headwaters of Roy Creek would be open for exploration, but no development is anticipated during the life of the plan. An estimated 50 acres would be disturbed by exploration for these elements. Exploration of placer resources in areas with medium development potential is anticipated to disturb 20 acres over the life of the plan. The RFD also predicts development of 20 miles of roads in support of exploration and development.

Impacts that may occur include direct disturbance to wildlife on priority habitats, fragmentation of habitat through important movement corridors, and long-term impacts to streams and riparian habitats.

Areas open to hardrock mineral leasing include portions of the current White Mountains caribou core calving and postcalving areas and winter range, historical Fortymile caribou calving and postcalving areas and current winter range, moose habitat, and Dall sheep movement corridors and habitat (see [section 3.2.8 Wildlife](#)). The northern portion of the open area, which includes the Roy Creek [REE](#) deposit and upper Bear and Quartz Creeks, are high use current and historic calving and postcalving areas for these two caribou herds.

Caribou are most vulnerable to disturbance during calving and postcalving (Fortymile Caribou Herd Planning Team 2000). However, development and exploration activities will not be authorized between May 15 and July 15 if the activity will interfere with caribou calving and postcalving activities, which will mitigate direct impacts (Appendix A, [ROP Wild-7 \[54\]](#)).

Additionally, leasing regulations (43 [CFR](#) 3500) allow a higher level of protection than locatable mineral laws. Therefore direct impacts from leasing activity are not expected to occur.

The following indirect impacts are expected to be greater and more difficult to mitigate: changes in access to currently remote areas, hardrock leasing related infrastructure (such as roads), and increased levels of human activity. These impacts may reduce the suitability of the area as caribou habitat from pre-calving through postcalving. Changes in access are not limited to projected road development. Areas cleared of vegetation for winter overland moves of large equipment are likely to be used as summer [OHV](#) trails. The expanded network of trails may be used by recreationists to reach previously inaccessible areas.

Fortymile caribou are unique among large caribou herds in that they are dependent on a relatively small area of upland tundra for pre-calving through autumn (Boertje et al. in press). Further, Boertje et al. (in press) expect that the White Mountains will become increasingly important to the Fortymile herd, given evidence that overgrazing has occurred on current core upland tundra habitat. Because of the projected importance of this portion of the historic Fortymile herd calving/postcalving range and the importance of this herd to subsistence hunters across the planning area, indirect impacts from exploration and development in the area may significantly restrict subsistence use by impacting abundance of Fortymile caribou. Additionally, when considered with decisions in the Draft RMP/EIS Alternative D for the Steese and Fortymile subunits and the cumulative case, significant restrictions on customary and traditional (subsistence) use may also occur.

The increased access from roads and pioneered trails in the area may shift the distribution of hunters but is not expected to reduce the availability of caribou for subsistence hunters across the planning area.

Spawning areas for Chinook salmon have been identified in Ophir Creek and rearing areas include Ophir and Nome Creek. Other undocumented spawning areas are likely to occur in other tributaries to Beaver Creek. Ophir Creek has been identified as an area with high development potential for gold and would be open to placer mining development under Alternative D. Impacts to this population of spawning salmon are likely to be direct, indirect and long-term and could contribute to the larger Yukon River drainage decline in Chinook salmon for subsistence use (see [section 3.2.2 Fish and Aquatic Species](#) and Cumulative Impacts Findings of this supplemental analysis).

Evaluation of the Availability of Other Lands

In Alternative D the BLM would manage to optimize resource use and development, with the fewest restraints of all alternatives on commercial activity (leasable minerals and forest products) and the fewest limitations on travel management and recreation activity of the action alternatives. Other federal lands in the subunit are managed under U.S. Fish and Wildlife Service planning documents and as conservation system units. Other BLM lands in the state are managed by current planning documents that allow a mixture of development and conservation following BLM's multiple-use mission, or are currently being evaluated through the planning process. State of Alaska and Native corporation lands cannot be considered in a BLM plan and BLM-managed lands outside of Alaska are not considered under [ANILCA](#).

Evaluation of Other Alternatives

Alternatives that would reduce or eliminate the use of public lands needed for subsistence use and resources include the three action alternatives (Alternatives B, C, and D) that are presented and analyzed in Chapters 2 and 4 of the Eastern Interior RMP/EIS (BLM 2012a). These alternatives were created to represent a wide-range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives considered, but not analyzed in detail, are also discussed in Chapter 2.

Findings

Alternative D with the addition of leasing of known mineral deposits as analyzed in this supplement may significantly restrict subsistence use of Fortymile caribou by communities in or near the planning area. Upland habitat quality in the current Fortymile caribou herd calving/postcalving and autumn range has been documented as declining and this upland portion of the former range is increasingly important to continued herd growth and stability. Fortymile caribou, which have not occupied the area since the 1960s, were documented in the eastern White Mountains NRA in 2011, indicating movement to the area may be beginning. Should the amount of hardrock mineral leasing development expand beyond that anticipated in the [RFD](#), this finding may need to be revised to take into account impacts to the White Mountains caribou herd and other subsistence resources and uses that cannot be mitigated.

B.3. White Mountains Cumulative Case

The goal of the cumulative analysis is to evaluate the incremental impact of the current action in conjunction with all past, present, and reasonably foreseeable future actions in or near the planning area. The cumulative analysis considers in greatest detail activities that are more certain to happen, and activities that were identified as being of great concern during scoping. Actions considered in the cumulative analysis include, but are not limited to the following (BLM 2012a section 4.2.4 Cumulative Effects):

Development of minerals will occur on state and private lands in the subunit. Effects will be similar to those described for activities on BLM lands, except that the level of activity is expected to be higher due to higher development potential, particularly on state lands.

Military aircraft use is allowed in Military Operation Areas over much of the White Mountains Subunit and is likely to increase. Impacts to wildlife resources important to subsistence could potentially occur. Current practices by the military to avoid exercises during caribou calving and implementing minimum ceilings have reduced but not eliminated impacts to caribou.

Research, monitoring and other land management activities will continue on all lands in the subunit and include access to remote areas by fixed and rotary wing aircraft, snowmobiles and other OHVs. Disturbance from these activities is localized and temporary.

Climate change will benefit some subsistence resources and negatively affect others. Changes in species distribution and vegetation communities in subarctic areas are predicted to occur by 2040. Frequency and severity of natural wildland fire in Interior Alaska are predicted to increase and result in shifts to deciduous and shrub-dominated landscapes, which may benefit moose and some furbearers but not caribou. Predicted increases in water temperatures would alter chemical

and biotic conditions to the detriment of subsistence fish diversity and abundance. Increases in soil temperatures would result in drying of lakes and ponds.

The population of Fairbanks and the surrounding area is predicted to increase by about 10 percent from the 2000 census to the 2020 census. Development of a gas line or other projects may boost the population beyond the estimate. Demands for recreation and subsistence resources are predicted to increase between 10 and 15 percent over the next 20 years. With the management emphasis on recreation in the White Mountains Subunit, increased use would be expected in this area.

Conveyance of remaining selected lands to the state and Native corporations is ongoing. Planning area wide, about 1.1 million acres are in selection by Native corporations (ANCSA 1971) and 1.4 million acres are in selection by the State of Alaska. Fish and wildlife management of harvest would be predicated on state regulations. Based on joint state/federal harvest management of White Mountains caribou herd in the subunit, no impacts to subsistence uses would be expected to occur. Impacts to use of fish and other wildlife may occur if state harvest regulations are more restrictive than federal regulations on those lands.

Alternative B would best protect subsistence resources in concert with actions occurring adjacent to BLM-managed lands in the White Mountains Subunit. Alternative C would somewhat increase impacts to subsistence resources and uses collectively with actions by other land managers adjacent to BLM-managed lands. Alternative D would potentially have the greatest impacts on subsistence resources and uses when added to decisions by adjacent land managers. Alternative A would have slightly less impacts from management prescriptions than Alternative D.

Evaluation of the Effects of Use, Occupancy, or Disposition

According to the analysis of fish and aquatic resources and wildlife resources in Chapter 4 of the Eastern Interior Draft RMP/EIS (BLM 2012a) and the Supplement (sections [3.2.2](#) and [3.2.8](#) of this document), the combination of ongoing locatable mineral development occurring on state, federal and private lands in the subunit combined with future uses and development projected for the subunit could result in cumulative impacts on subsistence resources that use the White Mountains Subunit. The privatization of State of Alaska or Native corporation lands could lead to additional development but is not expected to have cumulative impacts within the subunit.

Evaluation of the Availability of Other Lands

The Cumulative Case, as presented in the supplemental planning document, contains information on reasonably foreseeable activities that could have an effect on the management decisions being analyzed as part of the Hardrock Mineral Leasing Supplement. The purpose of the Cumulative Case is to present known ongoing activity by all entities on all lands near or within the planning area, as well as those activities that have been proposed for the future and are likely to occur. The Cumulative Case is not an implementable alternative that specifies land uses and management, and instead is a discussion of impacts that could affect the management decisions contained within Alternatives A through D. As such, no other lands are evaluated under the Cumulative Case.

Evaluation of Other Alternatives

Alternatives that would reduce or eliminate the use of public lands needed for subsistence include the three action alternatives that are presented and analyzed in Chapters 2 and 4 of the

Eastern Interior Draft RMP/EIS (BLM 2012a), as well as Alternative A. These alternatives were created to represent a wide-range of potential activities that could occur on BLM-managed lands, along with management actions that would serve to protect specific resource values following current national guidelines. Additional alternatives considered, but not analyzed in detail, are also discussed in Chapter 2.

Findings

Hardrock mineral leasing will add to the cumulative impacts from exploration and development of locatable and leasable minerals and other uses in the planning area allowed on BLM-managed lands, other federally managed lands, and state and private lands. The cumulative case, as presented in this analysis, may result in significant restrictions on subsistence use of Chinook salmon and Fortymile caribou in, adjacent to, and downstream from the planning area. Chinook salmon are an extremely important subsistence resource. The numbers of Chinook salmon have been declining throughout the Yukon River drainage over the past two decades, which increases the importance of each spawning population in the system. The infusion of genetic diversity from these small stocks, such as the Ophir Creek population, is extremely important for resiliency of the Yukon River Chinook salmon stocks. Additionally, when considered with decisions in the Draft RMP/EIS Alternative D for the Steese and Fortymile subunits and the cumulative case, significant restrictions on subsistence use of Fortymile caribou may also occur.

B.4. Notice and Hearings

The [ANILCA](#) Sec. 810(a) provides that no “withdrawal, reservation, lease, permit, or other use, occupancy or disposition of the public lands which would significantly restrict subsistence uses shall be effected” until the federal agency gives the required notice and holds a hearing in accordance with ANILCA Sec. 810(a)(1) and (2). The BLM will provide notice in the *Federal Register* that it has made positive findings pursuant to ANILCA Sec. 810 that the following alternatives or the cumulative case presented in the Draft RMP/EIS meets the “may significantly restrict” threshold: White Mountains Subunit, Alternative D; White Mountains Subunit, Alternative D in combination with the Cumulative Case. As a result, public hearings will be held in the potentially affected communities. Notice of these hearings will be provided by way of the local media, including the newspaper and the local radio station, with coverage to many villages in Eastern Interior Alaska.

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